

STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

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| Commonwealth Edison Co. |) | |
| |) | |
| |) | |
| Proposed general increase in |) | Docket No. 05-0597 |
| rates for delivery service. |) | |
| |) | |

**DIRECT TESTIMONY OF EDWARD C. BODMER
ON BEHALF OF THE CITIZENS UTILITY BOARD
AND THE COOK COUNTY STATE'S ATTORNEY'S OFFICE**

CUB-CCSAO EXHIBIT 1.0

December 22, 2005

**DIRECT TESTIMONY OF
EDWARD C. BODMER**

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DOCKET NO. 05-0159
BEFORE THE ILLINOIS COMMERCE COMMISSION
DIRECT TESTIMONY OF EDWARD C. BODMER
ON BEHALF OF THE CITIZENS UTILITY BOARD
AND THE COOK COUNTY STATE'S ATTORNEY'S OFFICE

I. QUALIFICATIONS AND SUMMARY OF RECOMMENDATIONS

Q. Please state your name and business address.

A. My name is Edward C. Bodmer. My business address is 5951 Oakwood Dr. Lisle, Illinois, 60532.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Citizens Utility Board (“CUB”), and the Cook County State’s Attorney’s Office (“CCSAO”).

Q. What is your present occupation?

A. I am a consultant specializing in utility regulation among other activities.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present an analysis of issues related to ComEd's cost of equity capital, cost of debt capital and its capital structure. I use this testimony to make a recommendation as to the appropriate overall rate of return to apply to ComEd's rate base.

Q. Please summarize your educational background and professional experience.

A. I received a B.S. degree in Finance with highest honors from the University of Illinois in 1979 and an MBA degree with honors from the University of Chicago in 1986. My regulatory experience began with my employment on

the Accounting and Finance Staff of the Illinois Commerce Commission (“Commission”) and has encompassed numerous assignments on regulatory issues as a consultant. In a past position as a Vice President at the First National Bank of Chicago, I managed the credit analysis of energy loans, which included evaluation of electric and gas utility company transactions. In that position I also directed a number of energy-related financial advice projects for bank clients.

Since 1989, I have developed a consulting practice in the electric utility industry which has involved assignments for financial institutions, utility companies, and government agencies. My projects have addressed a variety of topics, including industry re-structuring, valuation, forecasting, pricing, resource planning, and performance evaluation. As part of my consulting practice, I have testified before this Commission and regulatory commissions in California, Indiana, Kansas, Michigan, Maine, Minnesota, and Connecticut on a wide range of subjects.

Another component of my practice has involved teaching professional courses on valuation, project finance, credit analysis, financial modeling, and corporate finance. I have created and taught courses in South America, Asia, Australia, Western Europe, Eastern Europe, the Middle East, and Africa as well as in the U.S. My work has included workshops open to the public which I prepared for firms that market courses including Infocast, Euromoney, Terrapin, the Amsterdam Institute of Finance, the Financial Training Company, the New York Institute of Finance and others. In addition I have taught many customized in-house courses tailored to individual clients. My in-house clients have included HSBC (Hong Kong), ABN Amaro (Sao Palo), Citibank (Tokyo), Development Bank Singapore, CIMB (Malaysia), Lindlakers (London), Saudi Aramco, the Korean Power Exchange, UAE Offsets Group and others.

62 **Q. Do you have experience with Illinois regulation?**

63 A. Yes. I have a general familiarity with the utility companies in Illinois from my
64 work on the Commission Staff in the late 1970's and the 1980's. In the context
65 of subsequent consulting assignments, I have analyzed rate and financial
66 issues related to Commonwealth Edison Company ("ComEd," "Edison" or
67 "company") on a number of occasions. My projects involving ComEd have
68 included: testimony on elimination of rate 6L for large customers; testimony
69 on recovery of decommissioning costs; testimony in the two prior delivery
70 service cases; testimony on uniform tariffs; testimony on cost of service and
71 rate design in the 1994 rate case; analysis on behalf of the Suburban Councils
72 of Government with respect to implementation of the Infrastructure
73 Maintenance Fee and the Municipal Utility Tax; development of analyses to
74 support the City's franchise negotiations with Edison in 1990 and 1991;
75 testimony on behalf of the Illinois Attorney General, the Cook County State's
76 Attorney and the Governor of Illinois on costs and benefits of Edison's
77 proposed spin-off of nuclear plants; analysis of electricity legislative options
78 on behalf of the Local Government Electric Power Alliance¹; and direction of
79 the City's efforts in the co-operative cost study activities required by the
80 City/Edison franchise agreement.

81
82 **Q. Describe your experience with respect to analysis of the cost of capital?**

83 A. The first time I ever delivered testimony for the ICC Staff in 1980, it involved
84 measuring the cost of capital. In subsequent analysis as an employee of the
85 Accounts and Finance Department at the ICC, I testified on many issues
86 related to the financial justification for rate increases concerning ComEd and
87 other companies. This work included analysis of the appropriate capital
88 structure for ComEd while it was in the midst of its nuclear construction
89 program and ComEd's requirement for interim rate increases driven by its

¹ The Alliance includes the Chicago Transit Authority ("CTA"), the Chicago School Board, the Chicago Park District, the Chicago City Colleges, and the City of Chicago.

financial situation. More recently, I have been asked to speak on the cost of capital applicable to electricity generation at conferences and I have written on problems with using the Capital Asset Pricing Model (“CAPM”) in measuring the cost of capital for electric generation investments. As part of the courses mentioned above, I regularly include lectures on valuation and cost of capital. These lectures emphasize the practical aspects of measuring cost of capital given the well known problems associated with the CAPM. Finally, in various valuation analyses that are part of my consulting activities the appropriate cost of capital has been a subject of the valuation process.

II. OVERVIEW AND SUMMARY OF RECOMMENDATIONS

Q. What are your recommendations to the Commission?

A. My primary recommendations include:

- (1) The Commission should take great advantage of commercial information from the reports of three investment banks that is uniquely available in this case.
- (2) The appropriate capital structure for ratemaking purposes removes the entire amount of goodwill from ComEd’s balance sheet and uses ComEd’s debt balance outstanding at December 31, 2004.
- (3) The appropriate cost of debt for ComEd’s regulated distribution business is 6.23%.
- (4) The appropriate cost of equity for ComEd’s distribution business is 7.75%.
- (5) The cost of equity, cost of debt and capital structure percentages imply that ComEd should be allowed the opportunity to earn a 6.69% on its rate base.

Q. What is the general approach you have taken to measuring ComEd’s cost of capital and recommending an appropriate rate of return?

120 A. I have attempted to provide a practical and commercial perspective to measuring
121 ComEd's cost of capital and recommending a rate of return that is fair to
122 customers and investors. My analysis is different from the more typical
123 theoretical cost of capital testimony presented in rate increase proceedings that is
124 generally subject to bias in both selection of financial data and modeling
125 approaches. The primary basis of my cost of capital recommendation is from
126 information published by three leading investment banks – JPMorgan, Lehman
127 Brothers and Morgan Stanley -- in valuing the proposed multi-billion dollar
128 merger between Exelon and PSE&G. I suggest that using information from
129 investment bank reports on ComEd's cost of capital is preferable to typical cost of
130 capital testimony (such as the study developed by ComEd's witness Dr.
131 Hadaway) because the investment banks have better knowledge of the return
132 requirements of investors and are a direct proxy for investor requirements. I
133 demonstrate that the cost of equity capital component of the investment bank
134 weighted cost of capital numbers is precisely the same equity cost of capital that
135 must be estimated in this rate case. Finally, in valuing a merger transaction rather
136 than promoting increased rates, the investment banks do not have an incentive to
137 over-estimate the cost of capital as does ComEd in this case.

138
139 **Q. Please elaborate on why information from investment banks presented in**
140 **PSE&G transaction is useful to the Commission?**

141 A. Usually, the ICC must rely on the estimates of the cost of capital for utilities
142 derived from long and involved studies of stock market data because they lack
143 sufficient direct evidence of the minimum return investors really need in order to
144 continue making investments. Various estimation methodologies are designed to
145 bridge evidentiary gaps that arise because the level of return required to induce
146 real investors to provide capital for the firm is not directly observable. In this
147 case, however, the Commission is presented with a rare opportunity to use direct
148 evidence of investor requirements.

The coincidence of the on-going merger of Exelon (ComEd's ultimate parent) and PSE&G provides evidence of the rate of return required by investors from three major investment banks on whom such real world transactions depend. In published documents relating to the merger we have more direct expressions of investor expectations than is usually the case. The return on equity component used by investment banks in valuing free cash flows is the incremental return required by equity investors, exactly the same thing that Dr. Hadaway is estimating in his analysis. Given the availability of such practical information, the Commission should not prefer the indirect and theoretical over the more direct, actual data available for its consideration.

Q. What is your conclusion with respect to a fair rate of return for ComEd in this case?

A. Using information from reports presented as part of the PSE&G transaction to derive the cost of equity, treating goodwill appropriately in the capital structure, and accounting for the interest cost of debt issues that mature before or near the effective date of new rates, the fair return for ComEd is 6.69% as summarized on the table below.

| Summary of ComEd's Cost of Capital and Required Return | | | |
|--|--------------|-------|---------------|
| | Pct of Total | Cost | Weighted Cost |
| Debt | 69.60% | 6.23% | 4.34% |
| Equity | 30.40% | 7.75% | 2.36% |
| Total | | | 6.69% |

My estimate of the cost of equity capital in the above table comes from the following:

1. The weighted cost of capital figure of 5.5% reported by Morgan Stanley in the joint proxy/prospects associated with the proposed Exelon/PGE&G merger.^{2, 3}
2. A capital structure that removes the entire amount of goodwill from ComEd's balance sheet and uses ComEd's debt balance outstanding at December 31, 2004.
3. A debt cost of 6.23% that eliminates debt issues which mature before or shortly after January 1, 2007 and replaces the cost of the matured debt with the cost of debt that Exelon issued on behalf of ComEd this year.

The 6.69% rate of return results in a revenue requirement of \$146,475,000, assuming no adjustments to ComEd's proposed rate base and its proposed operating expenses. This increase in revenues of \$146 million is \$199 million less ComEd's request for a \$345 million increase.

Q. Have you reviewed the testimony of Dr. Hadaway supporting ComEd's proposed rate of return on equity?

A. Yes. My review of Dr. Hadway's analysis demonstrates how difficult it is to support ComEd's proposed return on equity of 11.0% using current financial data. Numerous flaws in his discounted dividend model, his application of CAPM, and his risk premium analysis reflect the struggle that must be made to come up with such a high number. With due respect to Dr. Hadaway, I submit that the ICC should take great advantage of the practical information provided by the JPMorgan, Lehman Brothers and Morgan Stanley mentioned above.

² See Amendment No. 3 to Form S-4 dated May 27, 2005 and published on the SEC website, www.sec.gov.

³ The Morgan Stanley 5.5% weighted cost is not directly comparable to the 6.69% rate of return in the above table because debt cost in the Morgan Stanley number is after-tax, capital structure percentages in their approach are derived from market rather than book values and the debt cost in their analysis is from the cost of new debt rather than embedded issues.

208 **III. TESTIMONY OUTLINE**

209

210 **Q. How have you arranged the balance of your testimony?**

211 A. After describing the organization of my testimony and an overview of contextual
212 issues relevant to the case, the rest of my testimony addresses ComEd's capital
213 structure, its cost of debt and its cost of equity. The cost of equity discussion
214 consists of a two-pronged approach where I first present the cost of equity derived
215 from direct expressions of investors' view of the overall cost of capital using
216 valuations in the ongoing PSE&G/Exelon merger. I then explain how the
217 investment bank number is consistent with the cost of capital computed from a
218 variety of independent analyses.

219

220 To confirm the cost of equity from statements made by JPMorgan, Lehman
221 Brothers and Morgan Stanley, I have used the typical CAPM and dividend
222 discount models ("DCF") that are often part of regulatory proceedings. I have
223 also verified the required equity return in the investment bank reports with a
224 couple of techniques that are somewhat less traditional. The less common
225 approaches include a regression of the market to book ratio against earned returns
226 on equity and derivation of the cost of equity from a formula often used in
227 analysis of the price to earnings ratio. All of these analyses – the market to book
228 ratio, the CAPM and the DCF -- demonstrate that ComEd's cost of equity capital
229 is at or below 7.75% and nowhere near the 11% proposed by the company as
230 shown in the table below.

| Summary of Alternative Cost of Equity Estimates | | |
|---|--|--------|
| Investment Bank Analyses | | |
| Morgan Stanley ComEd/PECO inferred | | 7.74% |
| ComEd Sponsored Studies | | |
| ComEd Recommendation | | 11.00% |
| Hadaway Traditional DCF | | 11.05% |
| Hadaway Adjusted DCF | | 9.35% |
| Hadaway CAPM | | 10.59% |
| Hadaway Risk Premium | | 10.78% |
| Verification of Investment Bank Analyses | | |
| Market to Book Ratio Regression | | 6.24% |
| CAPM | | 6.85% |
| DCF | | 7.88% |
| P/E Ratio | | 7.84% |

Q. Please outline the remainder of your testimony.

A. The remainder of my testimony explains the basis of my rate of return recommendation. The testimony is organized as follows into seven additional sections:

1. Overview and Context
2. Analysis of ComEd's Capital Structure
3. Analysis of ComEd's Embedded Debt Cost
4. Analysis of ComEd's Equity Cost from Numbers Reported in Investment Bank Studies
5. Verification of Investment Bank Cost of Capital Using Market to Book Analysis
6. Verification of Investment Bank Cost of Capital Using CAPM
7. Verification of Investment Bank Cost of Capital Using the Dividend Discount Model and P/E Ratios

282 **IV. OVERVIEW AND CONTEXT**

283

284 **Q. What is the weighted average cost of capital for ComEd?**

285 A. The weighted average cost of capital for ComEd is the average of the cost of debt
286 capital and the cost of equity capital. The cost of debt capital is an average of the
287 stated interest rate on various outstanding ComEd loans. The cost of equity
288 capital is the minimum rate of return that investors in a stock with similar risks to
289 ComEd would require in order to make an investment in that stock. Unlike the
290 cost of debt capital, the cost of equity capital cannot be directly observed in loan
291 agreements or bond prospectuses. The weighted average cost of capital is an
292 average of the debt and equity cost, where weights depend on the proportion of
293 debt and equity on the balance sheet.

294

295 The weighted average cost of capital used in regulatory proceedings applies the
296 actual pre-tax interest on ComEd's various debt obligations no matter when the
297 debt was originally issued. On the other hand, the weighted average cost of
298 capital used by investment banks in valuing ComEd's free cash flow uses the
299 incremental after-tax cost of issuing new debt. Capital structure percentages used
300 in calculating the weighted average also differ between the regulatory definition
301 and the approach used in valuation. Regulators measure capital structure
302 percentages with actual debt and equity amounts on the balance sheet. In
303 contrast, investment banks use the number of shares outstanding multiplied by the
304 share price to establish the market value of equity. While the debt cost and capital
305 structure percentages differ between the valuation and regulatory applications, the
306 cost of equity capital in the weighted average cost of capital is the same under the
307 regulatory definition as it is for valuation analyses. This is why the investment
308 bank weighted average cost of capital information provides such valuable
309 information.

311 **Q. What are some of the aspects of this case that differ from ComEd's previous**
312 **two delivery service rate increase cases from a cost of capital perspective?**

313 A. This case differs from the two earlier delivery service cases because of the
314 availability of information, the passage of new income tax laws, current
315 macroeconomic conditions, changes in ComEd's corporate structure, and the
316 health of ComEd's parent company. Some of the differences include:

- 317 - Availability of the weighted average cost of capital numbers recently
318 reported by JPMorgan Chase, Lehman Brothers and Morgan Stanley
319 which ranged between 5.25% and 6.45%. By contrast, the cost of capital
320 estimates reported by investment banks from the PECO/Unicom merger
321 prospectus in 2000 ranged from 7.5% to 11%.⁴
- 322 - Reductions in the personal income tax rates on dividends and capital gains
323 which mean that after-tax returns have increased by a substantial amount
324 for a given level of pre-tax return granted by the Commission.
- 325 - Declines in the overall level of interest rates in the economy.
- 326 - Lower prospective business risk faced by ComEd if ComEd's proposals
327 regarding power procurement in Docket No. 05-0159 are accepted.
- 328 - Lower volatility in revenues if ComEd's rate design proposals to increase
329 residential customer charges are accepted.
- 330 - Completion of large investments in distribution plant, which mean that
331 rate base growth relative to sales growth should moderate, and potentially
332 allow the company to earn more than its allowed return.
- 333 - Improvement in the financial condition of ComEd's parent, in part
334 because of the transfer of ComEd's generating plants to Exelon
335 Generation.
- 336 - Availability of an increased body of research that demonstrates upward
337 bias in application of historic risk premiums in the CAPM and an upward

⁴ Prospectus/Proxy Statement dated May 15, 2000, published on the SEC website, page 38 and page 51.

bias in earnings growth rate forecasts estimated by analysts that are used in DCF analyses.

Q. How should the ICC address these changed circumstances in establishing a fair level of DST rates?

A. The changed circumstances listed above affect both the estimation of ComEd's cost of capital and the manner in which the ICC should grant a return to ComEd once a range in cost of capital is established. In particular, the changed conditions make it much more likely that ComEd will earn more than its authorized return. When combined with other factors, the current environment implies that the ICC should select the low end of any cost of capital range when it makes its rate of return decision in this case.

Q. How does the requested return on equity and return on rate base requested by ComEd compare to the ICC decision in the last delivery service case?

A. ComEd has requested a slightly lower return on equity – 11.0% -- than the return granted by the ICC in the last delivery service case of 11.72%. (The date of the last decision was March 28, 2002 and the Company had requested a return on equity of 13.25% in that case). ComEd also has requested a much higher equity to capitalization ratio than the ratio that was used by the ICC in its prior delivery service case. In the last case, the ICC used a 42.86% ratio of equity to capital in determining the overall rate of return. In this case, ComEd proposes a higher equity ratio of 54.2%. Using ComEd's embedded debt cost of 6.5% and ComEd's requested equity return of 11.0%, ComEd's higher proposed equity ratio alone results in an increase in revenue requirement of \$34 million.

While the absolute return on equity request of 11.0% versus the 11.72% granted by the ICC in the last case may appear reasonable on its face, once changes in the federal tax law, changes in interest rates, changes in the requested capital structure

and changes in ComEd's risk are considered, ComEd is in fact requesting a much higher return than was granted in 01-0423. In the paragraphs below, I elaborate on how some of the changed circumstances over the past few years mean that the ICC should grant a much lower return to ComEd than it allowed in the prior case.

Q. How have changes in the federal tax law affected the pre-tax return on equity that the ICC must determine?

A. Changes in the tax law have lowered ComEd's pre-tax cost of equity. In its rate orders, the ICC grants utility companies a pre-tax return on equity rather than an after-tax return. Investors, however, are ultimately interested in the amount of money that goes into their pockets after they pay taxes. Significant reductions in the income tax on dividends and capital gains paid by investors as a result of the Bush Administration tax law changes in 2001 and 2003 have affected the pre-tax return required by investors. These tax reductions mean that if the ICC grants the same pre-tax return to ComEd or other utility companies, it is in fact allowing investors to realize a greater after-tax rate of return.

To illustrate the effect of tax law changes, consider the example of a married couple earning \$200,000 per year. For this couple, the marginal tax rate is 33% today, while before passage of changes in tax laws in 2001 it was 36%. Prior to tax law changes that came into effect in May 2003, dividends were taxed at the ordinary income rate; dividends are now taxed at 15%. Long-term capital gains tax rates were taxed at 20% prior to May 2003 and they are now taxed at a rate of 15%. Assuming income from an investment in ComEd ultimately is all received in dividends, the after-tax return granted in the last case of 11.75% would have yielded this married couple an after tax rate of return of 7.52% before 2001. After the Bush Administration tax cuts, the couple would now earn a return of 9.99%. The increase in after-tax return of 2.47% (assuming investments held for

395 dividends) more than offsets the slight decline in ComEd's request of 11.0%
396 relative to the 11.75% return granted in the last rate case.

397

398 **Q. How do interest rates compare with interest rates at the time of the decision**
399 **in the last delivery service case?**

400 A. In March 2002, when the Commission issued its interim order in docket 01-0426,
401 the yield on 10-year Treasury Bonds was 5.42%⁵. In late August, 2005, when
402 ComEd filed this case, the long-term treasury rate was 4.02%. The difference in
403 interest rates of 1.40% is almost twice the difference in the allowed equity return
404 from the last case versus the request in this case (11.75% versus 11.0%).

405

406 **Q. How do changes in ComEd's business risk after January 1, 2007 affect its**
407 **cost of equity?**

408 A. Given a level of financial risk driven by debt leverage and interest expenses, the
409 higher business risk, the higher the rate of return required to induce investors to
410 make investments. The relevant measure of business risk for purposes of
411 evaluating the cost of equity capital in this case is the risk that is present when
412 rates become effective after the end of the transition period on January 1, 2007.
413 For a number of reasons discussed below, the business risk facing ComEd will be
414 much lower after 2007 than it is today.

415

416 **Q. How will general business risks facing ComEd be different after the**
417 **transition period when new rates are paid by customers?**

418 A. If ComEd prevails in other aspects of this case and in its auction case, the
419 company will have less business risk than it has had as in integrated electric utility
420 company during the transition period. In the last case, ComEd emphasized its
421 business risk associated with being a "provider of last resort."⁶ ComEd's cost of

⁵ Source: St. Louis Federal Reserve Bank, Economic Data - FRED II (www.research.stlouisfed.org), series ID DGS10.

⁶ See the testimony of Sam Peltzman.

capital witness now acknowledges that this provider of last resort risk will be diminished because of stringent credit requirements on suppliers (Hadaway testimony at page 9.) Further, because generation costs will be passed directly to customers in ComEd's proposal, the company will not face the risks of operating leverage that arise from power contracts.

Q. Will risks facing ComEd be different after 2007 because of the changed revenue mix that will be in existence when ComEd becomes a pure distribution company?

A. Yes. Relative to being an integrated utility company, ComEd as a distribution company will receive a greater proportion of its operating income from residential customers. The increased residential proportion of operating income has two implications from the perspective of investor risk. First, residential revenues have less variation related to overall economic activity (non-diversifiable risk) than revenues it collects from other customer groups. Second, ComEd is proposing to increase customer charges from \$7.13 per month to \$9.65 per month for single family customers and from \$2.94 per month to \$9.65 per month for multi-family residences. These customer charge increases imply that a greater proportion of ComEd's revenues will not be subject to any variation at all in energy usage.

Q. Turning to information that was not available in the prior two delivery service cases, what have been some of the additions to the body of cost of capital literature in the past few years?

A. The cost of capital continues to be the subject of lively debate among financial economists. Some of the work that is most pertinent for rate proceedings suggests (1) estimating the cost of capital with a DCF model and growth rate forecasts derived from investment analysts overstates the required return on equity, and (2) market risk premiums used as an input to the CAPM should not rely on actual

realized returns such as those reported in the Ibbotson study. A few quotes from recent books and articles demonstrate these points:

- **Research has been performed suggesting that if the DCF formula is applied using analyst growth forecasts, the number will be too high.** A study by Chan, Karceski, and Lakonishok titled, “The Level and Persistence of Growth Rates,” published in 2003, was quoted by Dr. Hadaway. According to this study, analyst “growth forecasts are overly optimistic and add little predictive power.”⁷ The overestimation of growth rates made by investment analysts is noted by various researchers as a factor that causes upward bias in DCF cost of capital estimates. For example, in his book titled “Valuation for Mergers, Buyouts and Restructuring,” published in 2005, Enrique R. Arzac notes “if analysts’ growth expectations exceed the true but unobserved market expectations about future growth [the DCF formula] would itself generate an upward biased estimate of the equity premium.”⁸
- **Research has confirmed that the expected market risk premium (overall returns on the market versus risk free returns) is lower than was previously assumed.** A well known study by Fama and French, published in 2002, finds that “estimates [of the equity market risk premium] for 1951 to 2000, 2.55 percent and 4.32 percent, are much lower than the equity premium produced by the average stock return, 7.43 percent.”⁹ In another oft cited paper published in 2001 by Claus and Thomas titled “Equity Premia as Low as Three Percent? Evidence from Analysts’ Earnings Forecasts for Domestic and International Stock Markets,” the authors conclude that “for each year between 1985 and 1998, we find that the equity premium is around three percent (or less) in the United States and five other markets.”¹⁰
- **The size of the actual equity market premium realized in the market cannot be used to measure prospective equity returns.** Seth Armitage in his book “The Cost of Capital: Intermediate Theory” which was published in 2005 summarizes the current research as follows: “Almost all researchers on this question agree

⁷ Chan, L., Karceski, j and Lakonishok, J, 2003, The Level and Persistence of Growth Rates, Journal of Finance, 58, p. 643.

⁸ Arzac, Enrique, 2005, *Valuation for Mergers, Acquisitions and Restructuring*, John Wiley & Sons, p.44.

⁹ Fama, E. and French, K., 2002, “The Equity Premium”, Journal of Finance, Vol. 57, No. 2, pp. 637-659.

¹⁰ Claus, J and Thomas, J, 2001, “Equity Premia as Low as Three Percent? Evidence from Analysts’ Earnings Forecasts for Domestic and International Stock Markets”, Journal of Finance, 55, No 5., pp. 1629-1666.

487 *that the premium in the twentieth century in the United States ... has*
488 *turned out to be larger than investors expected it to be.”¹¹*
489

490 **Q. Continuing with the discussion of available information, why are the**
491 **reported weighted average cost of capital calculated by investment banks in**
492 **the PSE&G merger analysis important to the ICC in this case?**

493 A. The reports from the PSE&G merger transaction enable the Commission to take
494 advantage of an unusual opportunity to consider direct evidence of investor
495 expectations rather than judgments derived from theoretical computations such as
496 the CAPM or the DCF model. Part of the mandate of JPMorgan, Lehman
497 Brothers and Morgan Stanley in the merger transaction was to come up with a
498 valuation of ComEd, PECO and Exelon. In the process of making their
499 valuations, the investment banks discount cash flows at a cost of capital that
500 reflects required investor returns. If the valuations made by investment banks are
501 not biased, then the cost of capital figures that underlie the valuation are
502 presumably also unbiased. The cost of equity capital used by investment banks to
503 discount future cash flows is the opportunity cost that measures required returns
504 for investments of similar risk. This is the same number that the ICC must
505 establish in this proceeding.

506
507 The three Wall Street investment banks are at the center of financial activity and
508 they presumably have a far better notion of the returns required by investors than
509 Dr. Hadaway, the ICC Staff or me. That is to say, no matter what method the
510 investment banks used to estimate the cost of equity capital, their final number
511 should be consistent with their knowledge of returns demanded from actual
512 investors. I suggest that the judgment of bankers who are more closely attuned to
513 investor expectations should be substituted for the judgment of a Texas academic
514 who regularly presents testimony on behalf of utility companies or, alas, even a
515 Chicago consultant representing consumer interests.

¹¹ Armitage, S., 2005, *The Cost of Capital Intermediate Theory*, Cambridge University Press, p. 98.

516 **Q. How do the circumstances of this case affect the choice of return on equity**
517 **once a range in the cost of equity has been established?**

518 A. Those who estimate the cost of capital generally use alternative models and data
519 that result in a range of estimates. Ranges in estimates of the cost of capital are
520 consistent with the notion that stock prices can vary quite a bit from day to day
521 and modeling techniques are not precise. For example, Morgan Stanley estimates
522 a range in ComEd's weighted average cost of capital of between 5.5% and 6.0%.
523 Assuming cost of capital models and their application are correct, once a cost of
524 capital range is established, the fair rate of return set by the ICC in its rate order
525 could be anywhere within that range. As I explain below, because of ComEd's
526 ability to earn more than its cost of capital and due to the corporation's financial
527 integrity, the ICC should use the low range of the cost of capital estimate in
528 setting the allowed return.

529
530 **Q. How does the potential for ComEd to earn more than its allowed return and**
531 **the stellar financial condition of Exelon affect ComEd's cost of equity and the**
532 **allowed rate of return that the ICC should grant to ComEd?**

533 A. These two issues do not affect ComEd's cost of equity capital, but they are
534 relevant in setting a fair return once a range in cost of equity is established. The
535 potential for ComEd to earn more than the rate of return allowed by the ICC and
536 the financial performance of the corporation that owns ComEd imply that the ICC
537 should set the return on equity at the low point of the cost of equity range.

538
539 **Q. Are there conditions present in this case that will make it more likely for**
540 **ComEd to earn more than its allowed rate of return?**

541 A. Yes. Computation of test year revenues, operating expenses and rate base are
542 meant to establish a rate of return that will allow a utility to earn the return over
543 the tenure of rates. While this objective is clear, it is possible for utility
544 companies to earn more or less than their cost of capital after rates have been

established. Dr. Hadaway terms this phenomena regulatory lag which used to describe a situation where operating expenses and rate base grow at a faster level than operating revenues after rates have been established. When regulatory lag results from inflation in operating costs, the company earns less than its allowed return. In ComEd's case, regulatory lag could well cause the company to earn more than its rate of return. The combination of prospective sales growth, the low level of operating expenses relative to rate base and the completion of the company's catch up distribution capital expenditures point to the possibility of ComEd earning more than its allowed return in 2007 and beyond.

Q. Does the potential for ComEd to earn more than its allowed return imply that the ICC should set ComEd's allowed return at the low end of the cost of capital range?

A. Yes. The point is aptly explained by Seith Armitage:

"The allowed rate should *not* be set equal to the cost of equity, unless the potential for gain and loss is symmetric. A policy of resetting the rate to the estimated cost of equity would not, in general, be a consistent policy, because it would not assure that market value equals book value. If the cost of equity is 12 percent p.a. and the allowed range is between 8 percent and 20 percent p.a., the allowed rate would be set at less than the cost of equity, because there is more potential for upside than for downside."¹²

Q. Briefly describe the financial condition of Exelon, ComEd's parent company.

A. Exelon has a very strong financial condition as evidenced by its market to book ratio greater than three and its return on equity above 20% (before adjusting for goodwill which improve the ratios.) A comparison of returns on equity and market to book ratios demonstrates that Exelon now has the best financial performance in the entire utility industry. The ICC is being asked to approve a

¹² Ibid, p 330.

large rate increase for the company with the most stellar financial condition in the country.

Q. Has the financial status of the parent companies that own regulated utility subsidiaries affected ICC decisions in the past?

A. Yes. A prominent example is ComEd itself. In the late 1970's and early 1980's, while ComEd was not owned by a holding company, its financial condition (as represented by interest coverage and other credit measures) was instrumental in allowing the company to secure interim and permanent rate increases. In assessing ComEd's financial condition for purposes of setting rates at that time, it did not really matter whether an operating expense was above the line or below the line. Instead, the driver of rates was whether the company could raise money to finance its nuclear construction program. Just as the Commission considered the general financial condition when times were bad, the ICC can now consider the financial condition of Exelon in the narrow context of setting the rate of return within a range of independently determined cost of capital estimates.

V. ANALYSIS OF COMED'S CAPITAL STRUCTURE

Q. How have you reviewed ComEd's proposed capital structure used to derive its rate of return on rate base?

A. I have analyzed a number of issues associated with ComEd's proposed capital structure, including goodwill, bond rating targets, holding company debt and the appropriate date for establishing capitalization ratios. My analysis demonstrates that the capital structure percentages proposed by ComEd to determine its proposed rate of return in this case are not appropriate.

The most significant issue associated with ComEd's proposed capital structure is the question of whether goodwill on ComEd's balance sheet should be included in

its capital structure for purposes of determining its rate of return. Another question is whether a portion of the \$2 billion of debt issued at Exelon earlier this year by and booked as equity on ComEd's balance sheet should be considered as debt or equity in ComEd's capital structure for ratemaking purposes. I conclude that the Commission must remove all goodwill from ComEd's balance sheet when determining the capital structure and establishing the rate of return. I also conclude that the company's debt balance at the end of 2004 should be used to avoid distortions caused by the financial alchemy associated with Exelon's 2005 debt issues.

The table below illustrates ComEd's capital structure without goodwill at the end of 2004 and as of June 30, 2005. While the proportion of debt seems relatively high in the table (61%-72%), these numbers reflect the dollar amount of debt that ComEd actually must service associated from income associated with distribution assets. Adjusting goodwill does not affect ComEd's debt balance; it only influences the equity balance. ComEd's actual debt outstanding and the commensurate debt service requirements drive all of the credit ratios for the company. Using anything other than a capital structure without goodwill is tantamount to implementing a hypothetical capital structure.

The capital structure as of December 31, 2004 is not influenced by the recent financial schemes in which Exelon issued debt and booked it as equity at the ComEd level. However, as illustrated on the table, the June 30, 2005 capital structure does depend on the treatment of the Exelon debt. If the Exelon debt is included as ComEd debt, the equity to capital ratio falls to 28%.

| | Equity to Capitalization |
|------------------------------------|-----------------------------|
| June 30, 2005 without Exelon Debt | 38.9% |
| June 30, 2005 with Exelon Debt | 27.7% |
| December 31, 2004 without Goodwill | 30.4% |

I recommend that the ICC use the December 31, 2004 capitalization, which consists of 30.4% equity, in setting ComEd's rate of return. A reasonable case can also be made for including the debt recently issued by Exelon to pay pension costs for ComEd employees (suggesting that the 27.7% equity ratio should be used). However, there are two reasons why the 2004 balance is most reasonable. First, the 2004 balances avoid debates concerning the treatment of Exelon's 2005 debt issues. Second, the 2004 actual debt levels as reflected in the 30.4% equity ratio do not represent a hypothetical capital structure in which one must simulate credit quality rankings. Rather, the 30.4% equity ratio uses debt levels that produced ComEd's 2004 actual financial ratios when it did not own generating assets. I demonstrate below that these 2004 financial ratios produced from the company were consistent or better than medians for "A" rated companies.

Q. How does goodwill arise on a the balance sheet of a company?

A. Goodwill is booked as an asset on the balance sheet after completion of a merger transaction. The amount of goodwill reconciles payments by the purchasing company for the equity of the acquired company with restated fair market of assets and liabilities that are booked on the acquired company's balance sheet. The starting point for computing goodwill is the difference between amounts paid by the target for the stock of a company and the book value of the target company's equity. Goodwill is increased by transaction costs and it is reduced by net asset write-ups (and liability write-downs.) After goodwill is recorded on the balance sheet, companies must make periodic assessments to determine whether it is impaired.

Goodwill does not affect the original cost of distribution assets nor does it affect the level of debt on a company's balance sheet. For ComEd, goodwill in no way shape or form represents an investment made by PECO, Exelon or anyone else in the distribution assets of the company. With the exception of potentially

distorting the regulatory process, ComEd does not earn any money or receive any cash from Goodwill. ComEd's booked goodwill is affected by the way it chose to write-down its nuclear plants, but the goodwill has no benefits to delivery service customers. Had PECO purchased only the delivery service assets of ComEd, it would be hard to imagine that accountants would have allowed ComEd to record goodwill.

Q. How does goodwill affect ComEd's capital structure?

A. At June 30, 2005, ComEd had \$4,696 million of goodwill on its balance sheet and at December 31, 2004, it had \$4,705 million of goodwill outstanding. The goodwill is reported as an asset on ComEd's balance sheet and, because goodwill does not affect the outstanding debt, it increases ComEd's equity balance. If goodwill were not present on the asset side of the balance sheet or if it were written-off, ComEd's common equity would be reduced on a one-for-one basis for each dollar reduction in goodwill.

In ComEd's proposed rate of return calculation, the company makes an adjustment that increases its equity by \$2,292 million related to the PECO merger transaction. While ComEd removes this amount from its equity balance, its adjustment leaves remaining goodwill in its equity balance. (The amount of the goodwill reduction is consistent with Exelon's presentation to the financial analysts¹³, where it assumes that it will write-off one half of the goodwill at the end of 2005.) When all is said and done, ComEd's adjustment leaves more than \$2.4 billion on ComEd's balance sheet as shown on the table below:

¹³ For example, in the presentation to the EEI in November, it states in a footnote that "assumes half of ComEd goodwill is written off."

| Capitalization Ratios with and without Goodwill and Exelon Holding Company Debt (\$ millions) | | | | |
|--|---|---------------------|--------------------|---------------------|
| Without Goodwill Adjustment | June 30, 2005 | | December 31, 2004 | |
| | Debt Balance on ComEd's SEC 10-Q | | 4,875 | |
| | Less: Unamortized Debt Adjustments | | 242 | |
| | Net Debt Outstanding | | 4,633 | |
| | Common Equity on SEC 10-Q | | 6,740 | |
| | Total Capital with Goodwill | | 11,373 | |
| | Equity Ratio with All Goodwill Included | | 59% | |
| With Goodwill and ComEd Adjustment | ComEd Testimony | Without Goodwill | ComEd Testimony | Without Goodwill |
| | Equity Balance on 10-Q | | 6,740 | |
| | Less: ComEd Adjustments | | 9 | |
| | Less: Goodwill | | 4,705 | |
| | Adjusted Equity | | 2,026 | |
| | Net Debt | | 4,633 | |
| | Adjusted Total Capitalization | | 6,659 | |
| | Adjusted Equity Ratio | | 30.4% | |
| | Adjusted Debt Ratio | | 69.6% | |

The top part of the table above shows ComEd's actual debt and equity balances with the full amount of goodwill on its balance sheet. The bottom part of the table illustrates the capitalization ratios that result from ComEd's adjustment and from removing the entire amount of goodwill from the capitalization ratios. The table demonstrates that if there were no adjustment to remove any goodwill, ComEd's equity ratio would be 59% at the end of 2004, and 63% in mid 2005. (The reason ComEd's equity balance goes up in 2005 relative to 2004 is because of the transaction between ComEd and Exelon discussed above.) The table demonstrates by removing all goodwill from ComEd's balance sheet, its ratio of equity to capital is 30.4% at December 31, 2004 and its common equity ratio is 38.9% at June 30, 2005.

Q. If ComEd's proposed capital structure were adopted by the Commission, would revenue requirements be affected by goodwill?

A. Yes. If any goodwill is left on the balance sheet and if the other components of the weighted average cost of capital computation do not change, ComEd's revenue requirements are increased as a result of the goodwill. In the table below, I have computed ComEd's revenue requirement assuming different capitalization ratios with and without goodwill. The computations use ComEd's proposed 11% return on equity and its 6.5% proposed cost of debt. The table shows that revenue requirements are decreased by about \$47 million relative to ComEd's proposal if goodwill is removed from the June 30, 2005 capital structure. Similarly, revenue requirements are decreased by about \$73 million relative to ComEd's proposal if the December 31, 2004 capital structure without goodwill is used.

| Revenue Requirement Effects of Alternative Capital Structure Percentages | | | | |
|--|---------------------------------|-----------------------------------|------------------------------------|---------------------------|
| | Equity Ratio for Rate of Return | Net Revenue Difference (\$ 000's) | ComEd Requested Revenue (\$ 000's) | Percent Change in Request |
| ComEd's Proposal | 54.20% | - | 350,656 | 0.00% |
| All Goodwill, June 30 2005 | 60.30% | (18,619) | 350,656 | -5.31% |
| No Goodwill, June 30 2005 | 38.90% | 46,699 | 350,656 | 13.32% |
| No Goodwill, Dec 31, 2004 | 30.40% | 72,643 | 350,656 | 20.72% |

Q. Should ComEd's revenue requirements be increased because of the presence of goodwill?

A. No. Allowing goodwill to affect the revenue requirement violates the basic premise that rate base is determined from original cost. With goodwill on the balance sheet, the amount of invested capital exceeds the rate base and there is an increased proportion of equity on the balance sheet. Further, in the case at hand, goodwill resulted from PECO purchasing Unicom, the former holding company of ComEd, and not the other way around. It is certainly improper to have ComEd rates increased because of goodwill from the transaction while PECO's capital structure for ratemaking does not change. Finally, ComEd has not demonstrated

in any way that ratepayers have received benefits from paying higher rates because of the goodwill that was booked in the transaction.

Q. Does ComEd's partial adjustment to remove 49% of its goodwill appropriately reflect the balance of goodwill that should be included in the capital structure?

A. No. Revenue requirements should not be increased because of any goodwill arising from a merger transaction. After restructuring the corporation, ComEd now has assets on its balance sheet that only support the provision of delivery services. It also has debt on its balance sheet that has been issued to finance these assets and it has various other liabilities associated with its operations. Had no merger transaction taken place, the difference between net assets and debt would be the common equity balance. This is the equity balance that is appropriate for use in the weighted average cost of capital calculation.

The presence of any goodwill at all on the balance sheet increases revenue requirements relative to the revenues that would be present if no transaction occurred. ComEd's adjustment to remove some, but not all, of the goodwill does not leave ratepayers in the same position that they would have been in without the PECO merger transaction.

Q. Is use of ComEd's balance sheet without goodwill to establish capital structure percentages similar to using a hypothetical structure?

A. Not at all. Removing goodwill does not change the amount of debt that is supporting ComEd's investment in distribution assets. On the other hand, ComEd's approach effectively allocates some of its debt to goodwill and some of its debt to distribution assets. ComEd implicitly assumes that 24% or \$1.024 billion of its debt does not support its distribution assets. ComEd's proposal is therefore tantamount to advocating a hypothetical capital structure because the

debt on ComEd's balance sheet is hypothetically assumed to be somehow be serviced by goodwill that of course in reality does not generate any cash flow. Review of actual credit ratios and analysis of prospective distribution company risks demonstrates that ComEd's position in support of a hypothetical capital structure is not necessary.

Q. How should the Commission evaluate whether ComEd's actual capital structure balance at December 31, 2004 without goodwill is reasonable?

A. The issue should not be evaluated by a visceral reaction that 70% debt in the capital structure is somehow too high. The capital structure percentage is simply a statistic that results from analysis of whether the company covers debt service requirements driven by the amount of debt that was actually outstanding on the balance sheet. If the dollar amount of debt leaves the company in reasonable financial shape and if the debt does not finance generating assets, there is no basis for advocating a hypothetical capital structure. The amount of debt rather than the capital structure percentages that come out of the calculation must drive the ICC capital structure analysis.

Q. Turning to the debt level in the capital structure, how does ComEd justify the amount of debt in its proposed capital structure?

A. ComEd suggests that the reduced amount of debt on its balance sheet as of June 30, 2005 is necessary to maintain an "A" bond rating. ComEd's witness Mitchell acknowledges that it does not need to raise money for new investments but he still maintains a keeping a strong bond rating is important:

Although we expect to finance the majority of ComEd's capital expenditures with internally generated cash, it is important to maintain a strong balance sheet and credit rating to ensure access to the capital markets if unforeseen developments should occur and for refinancings of maturing debt. In addition, strong credit ratings are important in obtaining a reasonable price for power as ComEd enters into power contracts with outside suppliers, as currently proposed in the ongoing procurement

proceeding, because suppliers will look more favorably upon companies with solid credit ratings. (ComEd Exhibit 7.0, beginning at line 96)

If there was more debt outstanding than the levels present at June 30, 2005, ComEd suggests that it could be downgraded by the rating agencies. By implication, this means that the amount of debt outstanding at the end of 2004 was too high to keep its then present bond rating. ComEd's position is illustrated by the following statement in Mr. Mitchell's testimony:

The rating agencies supported ComEd's 2004 debt retirement program. Absent a reduction in debt levels or an increase in funds from operations over a period of two to three years, ComEd's ratings would likely have been downgraded, thus resulting in an increased cost of capital and other negative impacts that result from weaker credit ratings. (ComEd Exhibit 7.0 at line 153)

Q. Do ComEd's financial ratios demonstrate that it had too much debt outstanding at the end of 2004 to maintain an "A" rating?

A. No. The task of a credit rating agency in rating bonds is to determine the probability that debt obligations will default and the loss that would be incurred by lenders after defaults do occur. Rating agencies use a number of techniques to gauge the probability of default including assessment of business risks, industry risks, liquidity and prospective cash flow.¹⁴ The rating agencies also use historic financial ratios to measure financial risk in assessing the amount of cash flow that will be available to service debt. Given ComEd's prospective low business risk and the fact that it exceeded the median ratios for "A" rated utility companies published in 2004, ComEd's position that debt had to be reduced is not supportable.

¹⁴ For example, see Ganguin, B. and Bilardello, J., 2005, Fundamentals of Corporate Credit Analysis, McGraw-Hill Books.

Q. How did ComEd's 2004 financial ratios compare to other companies with an "A" rating?

A. ComEd's credit ratios were very strong when it serviced its actual 2004 debt without any ownership of generating assets. I have analyzed ComEd's performance relative to Standard and Poor's published benchmark ratios in the table below.¹⁵ The ComEd 2004 ratios are from Fitch and the 2005 ratios are from Exelon's EEI presentation.

| Comparison of ComEd Financial Ratios with S&P Medians | | | | | | |
|--|--------------------------------------|------|------|------|--------|-------------------|
| | 2003 Medians from Standard and Poors | | | | | ComEd 2004 (2) |
| | AA | A | BBB | BB | B | |
| EBIT interest coverage (x) | 5.0 | 3.2 | 2.3 | 1.9 | 0.8 | 5.4 |
| FFO interest coverage (x) | 8.8 | 4.7 | 3.9 | 2.7 | 1.4 | 4.7 |
| FFO/Average total debt (%) | 35.7 | 21.5 | 17.0 | 13.5 | 5.0 | 30.0 |
| Total debt/Capital (%) | 55.7 | 54.9 | 59.1 | 75.2 | 74.6 | 34.3 |
| Return on common equity (%) | 12.0 | 9.5 | 7.3 | 6.1 | (26.1) | 10.3 |
| (1) Exelon EEI Presentation in November for FFO interest coverage, FFO to debt and Debt to Capitalization (2) Fitch Report from ComEd Exhibit 7.8 for EBIT to Interest, FFO interest coverage, FFO to total debt and debt to capitalization | | | | | | |

The table demonstrates that ComEd exceeded the median benchmarks for "A" rated utilities in 2004, suggesting the end of year capital structure was in fact consistent with ComEd's "A" rating target. With the exception of the last two ratios on the above chart, goodwill has no effect on the credit barometers. If ComEd were to write off all of its goodwill, the interest coverage, the funds from operations to debt, the funds from operations to interest would not be affected in any way. Without goodwill, the debt ratio would obviously increase but so would the return on equity.

Q. Do recent credit rating problems demonstrate that ComEd had too much debt outstanding in 2004?

A. No. The ComEd's bond rating problems have arisen because of threats it has made regarding consequence of its auction proposal not being adopted as

¹⁵ The S&P report is from "Corporate Ratings Criteria--Ratings And Ratios: Ratio Medians", published 9 June, 2005.

889 illustrated by the following statement that Exelon made in its third quarter 10-Q
890 report.

891
892 “Adverse consequences [of the ICC not approving ComEd’s positions] could
893 include, but may not be limited to, ComEd’s insolvency or bankruptcy access for
894 ComEd to credit markets to finance operations and capital investment, and loss of
895 ComEd’s capacity to enter into bilateral long-term energy procurement contracts,
896 which would likely force ComEd to procure electricity at more volatile and
897 potentially higher prices in the spot market. Moreover, to the extent ComEd is not
898 permitted to recover its costs, ComEd’s ability to maintain and improve service
899 may be diminished and its ability to maintain reliability may be impaired.”

900

901 When the chairman of a company threatens bankruptcy, it would be imprudent for
902 credit agencies not to take note. Statements made by ComEd such as the above
903 quote have nothing to do with whether its 2004 level of debt was reasonable in
904 light of business risks facing the company.

905

906 **Q. Do you agree with ComEd’s position that it needs to maintain an “A” rating**
907 **from the credit rating agencies?**

908 A. I do not. While the issue is somewhat moot because I understand ComEd’s first
909 mortgage bonds were downgraded by to BBB+ by S&P, from the perspective of a
910 ComEd ratepayer, the benefits of slight increases in the credit spread that would
911 occur if the company had a bond rating below “A” do not outweigh the benefits of
912 reduced equity in the capital structure. Prospectively, it is important to realize
913 that ComEd will have very low business risk if its proposals for procuring power
914 are accepted and that it can support high debt to capital percentages.

915

916 To demonstrate the questionable advantages of maintaining an “A” rating at
917 ComEd one has to look no further than the recent \$2 billion of unsecured notes
918 that were issued by Exelon. The bond issues at Exelon have a “BBB+” rating,
919 below ComEd’s “A” target. The BBB+ debt did not have high costs to the
920 company as evidenced by the fact that the average interest cost of this Exelon debt

is only 4.81%. The low cost of the \$2 billion issue and the fact that Exelon chose to make the issue at the Exelon level rather than the ComEd level demonstrates that ComEd's bond rating objective is not necessarily optimal.

Q. Can ComEd support relatively high debt percentages on a prospective basis?

A. Yes. ComEd's low level of business risk allows it to maintain a relatively high debt to capital percentage. Further, the debt to capital ratio of 69.6% is below some of the companies in Dr. Hadaway's sample and it is similar to others. In a book written by two senior credit analysis professionals from Standard and Poor's in 2005, Blaise Ganguin and John Bilardello explain the relationship between business risk and financial leverage as follows:

"Another way of thinking about the relationship between business and financial risks would be to allow more aggressive credit ratios when the business risk is lower. Let's take the case of water utilities: In most cases, both supply and demand are generally fairly predictable, and once pipes are in the ground and maintained properly, the cost of running a water utility is very predictable. Hence cash flow predictability and volatility should be fairly good, allowing a higher level of financial risk."¹⁶

Post 2007, ComEd would be quite analogous to the water utility in the above quote and would be able to operate with high debt leverage. In my opinion the ICC should encourage distribution companies to increase take advantage of high debt capacity given their very low business risk. However, I recognize that the ICC does not normally use hypothetical capital structure ratios presumed on maximum debt capacity in setting the rate of return.

Q. Describe the debt issued by Exelon at the holding company level to fund its ComEd subsidiary.

¹⁶ Ganguin, B. and Bilardello, J., 2005, Fundamentals of Corporate Credit Analysis, McGraw-Hill Books, p. 277.

950 A. Exelon has \$2.5 billion of debt at the holding company level that funds equity in
951 its subsidiary companies – ComEd, PECO and Exelon Generation. \$2 billion of
952 the debt was issued in 2005 and consists of \$1.7 billion in long-term notes as well
953 as \$300 million in a term loan that carries a variable interest rate. In Exelon’s 10-
954 Q report the company explains that proceeds from this debt were used to fund
955 pension obligations of ComEd, PECO and Exelon Generation and that Exelon
956 contributed to the capital of each subsidiary company. Had Exelon directly issued
957 this debt at the subsidiary level, ComEd’s capital structure at June 30, 2005 would
958 have had a higher proportion of debt. Under this scenario, ComEd’s debt would
959 be increased by the debt that was placed at Exelon and ComEd’s equity balance
960 would be reduced by the same amount. If the holding debt were placed at the
961 subsidiary ComEd level, and with a write-off of goodwill, the common equity
962 ratio would be 27.7% at June 30, 2005, lower than ComEd’s equity ratio at the
963 end of 2004.

964
965 **Q. What is your recommendation with respect to an appropriate capital**
966 **structure for purposes of setting rates?**

967 A. The most appropriate common equity ratio and debt ratio is derived from balances
968 at the end of 2004 without goodwill. This results in a common equity ratio of
969 30.4% and a debt to capitalization ratio of 69.6%.

970 **VI. ANALYSIS OF COMED’S COST OF DEBT**

971
972
973
974 **Q. How have you have analyzed the appropriate cost of debt to be used in**
975 **ComEd’s weighted average cost of capital cost calculation?**

976 A. Before delving into issues related to measuring the cost of equity, I discuss my
977 review of ComEd’s and Exelon’s actual cost of debt. The primary issue I address
978 is whether loans that mature before the effective date of rates should be included
979 in the calculation of embedded debt cost. I have also considered approaches to

estimate the cost of replacing issues that mature before the effective date of rates. Through removing debt issues that mature before or near the January 1, 2007 (when rates become effective for most customers) and replacing those debt issues with the costs experienced in the recent Exelon debt transactions, I recommend that the Commission use a 6.23% cost of debt in setting ComEd's rate of return.

Q. What is the basis for using embedded cost of debt and incremental cost of equity in rate proceedings?

A. The cost of long-term debt not having variable rates is fixed with a contract while equity holders have no fixed price contract. Regulators generally allow equity holders to realize a return on current investments that will promote continued investments. Interest cost attributed to rate base is treated like other actual test year expenses with the result that residual income to equity holders is not affected by gains or losses on debt contracts.

Q. What is the average cost of debt calculated by ComEd using the December 2004 and the June 2005 capital structure?

A. ComEd computes its embedded cost of debt as 6.54% at December 31, 2004 and as 6.50% at June 30, 2005. ComEd's analysis includes calculating the cost of debt for each issue outstanding and includes amortization of premiums paid on the issues as well as the amortization of losses from early debt retirements.

Q. Are ComEd's debt calculations appropriate?

A. No. While I do not quarrel with the mechanics of ComEd's embedded debt cost calculation, these computations include a number of fixed rate loans that will mature before or near the date rates become effective on January 1, 2007 for customers who currently pay frozen rates. It is not appropriate to include the cost of debt contracts that will not be outstanding when rates are in place. Debt issues that ComEd includes in the embedded debt cost calculations which are maturing

before or very shortly after the date that rates become effective are shown on page 1 of Exhibit 1.01. The interest cost of these issues should not be included in ComEd's calculation of its embedded debt cost because these debt contracts will not influence its interest expense once new rates are in place. Thus, they are irrelevant for the ratemaking process.

Q. How should the embedded debt cost be adjusted to remove the debt issues that will mature before or very soon after new rates become effective?

A. Since the amount of debt supporting rate base is determined through evaluation of the appropriate capital structure, it is appropriate to assume that the maturing debt will be refinanced.

Q. How have you calculated the cost of replacing ComEd's maturing debt?

A. I have used the cost of debt that was issued by Exelon earlier this year because it represents actual debt costs. As I explained above, this debt will actually be used to finance activities at ComEd. The interest rate on this debt is fixed, known and measurable. Further, the amount of maturing debt of \$809 million approximately equals the \$803 million of Exelon debt that was allocated to ComEd. The cost of this Exelon debt issued in 2005 and allocated to ComEd was 4.813% as documented on page 2 Exhibit 1.01. The Exhibit shows that when the cost of maturing issues is replaced with the cost of the Exelon debt, ComEd's embedded cost of debt is 6.23%.

VII. ANALYSIS OF COMED'S EQUITY COST CALCULATIONS USING NUMBERS REPORTED BY INVESTMENT BANKS

Q. Why did JP Morgan, Morgan Stanley and Lehman Brothers compute the weighted average cost of capital and the cost of equity capital?

A. The investment banks were hired by Exelon and PSE&G to among other things make sure that the value of shares exchanged by PSE&G shareholders for Exelon

1039 shareholders is fair to all concerned. The valuations were in part derived from
1040 making projections of free cash flows generated by ComEd, PECO, Exelon and
1041 PSE&G. The following statement by Morgan Stanley from the merger prospectus
1042 demonstrates how valuations are derived from computing market-based discount
1043 rates:

1044
1045 The free cash flows and range of terminal values were then discounted to present
1046 values using a range of discount rates which were chosen by Morgan Stanley
1047 based upon an analysis of market discount rates applicable to comparable
1048 companies in the electric utility sector.¹⁷

1049
1050 I have included excerpts from statements made by the three investment banks are
1051 included in Exhibit 1.02.

1052

1053 **Q. How have you computed the cost of equity capital from statements made by**
1054 **JPMorgan, Morgan Stanley and Lehman Brothers?**

1055 A. I have used the weighted average cost of capital estimate made by Morgan
1056 Stanley of 5.5% which was applied to ComEd and PECO cash flows. Since
1057 ComEd was not willing to provide the cost of equity component of the Morgan
1058 Stanley estimate (see Exhibit 1.03 which includes ComEd's data request
1059 response), I have derived the cost of equity implicit in the Morgan Stanley's
1060 weighted average cost of capital figure. Using a 50% market debt to
1061 capitalization ratio and an incremental debt cost of 5.4%, I have inferred that
1062 Morgan Stanley estimated ComEd's cost of equity to be 7.74% (rounded to 7.75%
1063 in my summary analysis).

1064

1065 **Q. Summarize the weighted average cost of capital reported by JPMorgan**
1066 **Chase, Lehman Brothers and Morgan Stanley in the joint prospectus**
1067 **published as part of the PSE&G transaction?**

¹⁷ Joint prospectus/proxy statement, May 27, 2005 p. 86.

1068 A. All three of the investment banks presented estimates of weighted average cost of
1069 capital. JPMorgan and Lehman Brothers reported the cost of capital for Exelon
1070 while Morgan Stanley quoted numbers for ComEd and PECO. JPMorgan
1071 estimated that the weighted average cost of capital is between 5.25% and 5.75%;
1072 Lehman Brothers applied a discount rate (presumably derived from the weighted
1073 average cost of capital) of between 5.43% and 6.43% to Exelon free cash flows;
1074 Morgan Stanley used a weighted average cost of capital range from 5.5% to 6.0%
1075 for ComEd and PECO free cash flows. The table below summarizes the three
1076 estimates:

| Investment Bank | Cash Flow Discounted | Low Range | High Range |
|-----------------|----------------------|-----------|------------|
| JPMorgan | Exelon | 5.25% | 5.75% |
| Lehman Brothers | Exelon | 5.43% | 6.43% |
| Morgan Stanley | ComEd and PECO | 5.50% | 6.00% |

1086
1087 The specific text associated with these three weighted average cost of capital
1088 estimates is shown in Exhibit 1.02 (the direct quotes involving weighted average
1089 cost of capital are emphasized.)

1090
1091 **Q. Why did you use the Morgan Stanley weighted average cost of capital figure**
1092 **rather than the numbers quoted by JPMorgan Chase or Lehman Brothers?**

1093 A. I used Morgan Stanley's numbers simply because that estimate was applied
1094 directly in the discounting of ComEd free cash flows. The numbers from
1095 JPMorgan and Lehman Brothers confirm the Morgan Stanley number is not some
1096 kind of aberration. Indeed, since Exelon Generation is riskier than the ComEd
1097 and PECO distribution companies, one would expect the JPMorgan and Lehman
1098 Brothers numbers to be higher than the Morgan Stanley estimate. I refer to the
1099 low range of the Morgan Stanley weighted cost of capital because, as I explained
1100 above, it is appropriate to use the low end of cost of capital ranges in this case.

1101
1102 **Q. Can the weighted average cost of capital of 5.5% reported by Morgan**
1103 **Stanley be directly compared to ComEd's requested rate of return of 8.94%?**

1104 A. No. There are three differences between the way weighted average cost of capital
1105 is generally computed for valuing free cash flows and the weighted cost of capital
1106 used in measuring required return in ratemaking proceedings. The weighted
1107 average cost of capital used in valuing free cash flows is generally computed
1108 using market rather than book weights in the capital structure; debt cost is
1109 measured on an after-tax basis rather than a pre-tax basis (using statutory tax
1110 rates); and, debt cost is measured using the cost of new borrowings rather than
1111 embedded actual costs.¹⁸ The cost of equity used in the weighted average cost of
1112 capital for computing free cash flow, however, is that same opportunity cost that
1113 measures the return required by investors with similar cash flow risk. The table
1114 below summarizes the differences between the weighted average cost of capital
1115 used in discounting free cash flows and the weighted average cost of capital used
1116 in rate of return proceedings:

| WACC in Valuing Free Cash Flow | | WACC in Computing Regulatory Rate of Return |
|-----------------------------------|------------------------|--|
| Cost of Debt | Incremental, After-tax | Embedded, Pre-tax |
| Capital Structure | Market Weights | Book Weights |
| Cost of Equity | Opportunity Cost | Opportunity Cost |

1124
1125 **Q. Have you asked ComEd to provide supporting calculations that underlie the**
1126 **Morgan Stanley weighted average cost of capital calculations?**

1127 A. Yes. In presenting their valuation to Exelon management, investment banks
1128 generally provide the details of their calculations including the cost of equity and
1129 the method used to make their computations. These presentations are generally
1130 discussed by executives with titles such as "Chief of Staff" and "Chief Financial

¹⁸ Computation of the weighted average cost of capital is documented in many texts. For example, see Armitage, page 52.

1131 Officer.” My data request for the back-up related to the JPMorgan, Lehman
1132 Brothers and Morgan Stanley weighted average cost of capital as well as
1133 ComEd’s response is included as Exhibit 1.03.

1134

1135 **Q. What was ComEd’s Response to your data request?**

1136 A. As shown on Exhibit 1.03, ComEd declined to provide the cost of equity, cost of
1137 debt and the capital structure percentages because it said the information is not in
1138 its possession.

1139

1140 **Q. Is it surprising ComEd has not obtained the back-up behind the Morgan**
1141 **Stanley weighted average cost of capital number?**

1142 A. Yes. Since ComEd was in the midst of preparing a rate case, one would think the
1143 company would procure as much relevant information as possible. ComEd could
1144 have easily requested and received the back-up to the investment bank studies
1145 from its parent to assure that cost of capital estimates from the consultant it hired
1146 are consistent with the opinions of major financial institutions. It is unfortunate
1147 that the company will not now make a phone call to its parent company to request
1148 the information so that the ICC can make a more informed decision.

1149

1150 **Q. Given that ComEd did not provide information behind the Morgan Stanley**
1151 **weighted cost of capital number, can the cost of equity be inferred?**

1152 A. Yes. Once the statutory tax rate, the incremental cost of debt and the market debt
1153 to capitalization ratio, are established, the cost of equity can easily be computed.
1154 The table below shows the implied cost of equity using the 5.5% weighted
1155 average cost of capital reported by Morgan Stanley. In this table, I use a statutory
1156 tax rate of 39.71%, market debt to capital percentages of between 30% to 50%
1157 and ranges in the incremental cost of debt between 4.8% and 6.4%. As explained
1158 below, this range bounds the possible ranges of parameters used by investment

banks. The table shows that the range in cost of equity capital is between 6.20% and 8.11%.

| Inferred Cost of Equity Capital From Alternative Debt Cost and Capital Structures | | | | | | | | | | |
|---|--------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Debt to Capital Ratio | | Incremental Debt Cost | | | | | | | | |
| | | 4.800% | 5.000% | 5.200% | 5.400% | 5.600% | 5.800% | 6.000% | 6.200% | 6.400% |
| | 30.00% | 6.62% | 6.57% | 6.51% | 6.46% | 6.41% | 6.36% | 6.31% | 6.26% | 6.20% |
| | 32.50% | 6.75% | 6.70% | 6.64% | 6.58% | 6.52% | 6.46% | 6.41% | 6.35% | 6.29% |
| | 35.00% | 6.90% | 6.84% | 6.77% | 6.71% | 6.64% | 6.58% | 6.51% | 6.45% | 6.38% |
| | 37.50% | 7.06% | 6.99% | 6.92% | 6.85% | 6.77% | 6.70% | 6.63% | 6.56% | 6.48% |
| | 40.00% | 7.24% | 7.16% | 7.08% | 7.00% | 6.92% | 6.84% | 6.76% | 6.67% | 6.59% |
| | 42.50% | 7.43% | 7.34% | 7.25% | 7.16% | 7.07% | 6.98% | 6.89% | 6.80% | 6.71% |
| | 45.00% | 7.63% | 7.53% | 7.44% | 7.34% | 7.24% | 7.14% | 7.04% | 6.94% | 6.84% |
| | 47.50% | 7.86% | 7.75% | 7.64% | 7.53% | 7.42% | 7.31% | 7.20% | 7.09% | 6.99% |
| | 50.00% | 8.11% | 7.99% | 7.87% | 7.74% | 7.62% | 7.50% | 7.38% | 7.26% | 7.14% |

The main point of this table is that all plausible cost of equity estimates are nowhere near the cost of equity of 11% used by ComEd in the case. The 7.74% figure is my estimate of reasonable numbers for incremental debt cost and the market debt to capital ratio.

Q. Why is 50% a reasonable number to use as Morgan Stanley's market-based debt to market capitalization ratio?

A. If the market to book ratio is greater than one and if the market value of debt is reasonably close to the book value of debt, the debt to capitalization ratio is lower when measured on a market basis than it is on a book basis. For example, assuming the market value of debt equals the book value, Exelon's debt to capitalization on using the equity market value at the end of 2005 was 32%. This compares with the debt to capitalization ratio of 58% on a book basis. As shown on the table above, a lower debt to capital ratio results in a lower inferred cost of equity. While one could easily argue that the debt to capital ratio should be in the range of 30-40%, I have assumed a 50% market debt to capital ratio to assure that I am not understating the Morgan Stanley figure.

1193 **Q. Why is 5.4% a reasonable number to use as Morgan Stanley's incremental**
1194 **cost of debt?**

1195 A. The Morgan Stanley study was presumably performed in late 2004 or early 2005.
1196 ComEd did not issue new mortgage bonds in 2004, while PECO issued a bond
1197 with an interest rate of 5.90%. The 10-year Treasury Bond yield at the end of
1198 2004 was 4.24%. Adding 100 basis points to the risk free rate, per the testimony
1199 of Dr. Hadaway, yields a debt cost of 5.24%. Finally, the Exelon long-term notes
1200 issued in the second quarter carried an interest rate of 5.6%. Given this
1201 information, a 5.4% debt cost is reasonable as the Morgan Stanley incremental
1202 cost of debt number.

1203

1204 **VIII. VERIFICATION OF INVESTMENT BANK COST OF CAPITAL**
1205 **USING MARKET TO BOOK ANALYSIS**

1206

1207 **Q. How have you computed ComEd's cost of equity using data from market to**
1208 **book ratios in the utility industry?**

1209 A. Using the fundamental proposition that when a company is earning its cost of
1210 capital, the market to book ratio equals one, I estimate the return on equity would
1211 result in a unitary market to book ratio. To do this, I have compiled a database of
1212 market to book ratios and the forward returns on equity for the utility industry so
1213 that I can develop an equation relating the market to book ratio with the return on
1214 equity. Once I derived an equation relating the market to book ratio to the return
1215 on equity, I backed into the return on equity that yields a market to book ratio of
1216 one.

1217

1218 **Q. What is the cost of equity capital that results from the market to book value**
1219 **analysis?**

1220 A. Through estimating the relationship between return on equity and the market to
1221 book ratio, the cost of equity ranges between 5.65% and 6.82%. These very low

1222 numbers confirm that the Morgan Stanley 7.75% cost of equity capital does not
1223 overstate ComEd's required return on equity.

1224

1225 **Q. Is this cost of equity estimate plausible given that it is not much above the**
1226 **cost of debt?**

1227 A. Yes. Long-term debt carries inflation risk that is not present with equities and the
1228 personal tax rate on interest at ordinary income rates is now more than the
1229 personal tax rate on dividends and capital gains. These factors combined with the
1230 very low non-diversifiable risk of utility companies mean that the cost of equity
1231 for utility companies may well be less than the cost of long-term debt. The cost
1232 of equity number resulting from the market to book ratio analysis is certainly
1233 more plausible than the cost of equity estimated by Dr. Hadaway of 11% which is
1234 more than 6% above the yield on treasury bonds for a company with very little
1235 business risk.

1236

1237 **Q. Explain why the market value of a regulated utility company equals the book**
1238 **value when a company is earning its cost of capital?**

1239 A. A basic proposition of utility cost of capital theory is that if a company is
1240 expected to precisely earn its cost of capital on a continuing basis, the market
1241 value will equal the book value. If an investment earns exactly its cost of capital,
1242 then the market value of the investment will be equal to the amount of the
1243 investment. In the case of a utility company, the investment in debt and equity is
1244 approximated by the rate base. Therefore if the company is earning its cost of
1245 capital, the present value of the earnings stream discounted at the cost of capital
1246 will be the same as the rate base. Where the company is earning its embedded
1247 cost of debt capital as well as its opportunity cost of equity capital, the book value
1248 of debt is recovered through recovering the embedded debt cost and the market
1249 value of equity equals the book value of equity. This means if the return on

1250 equity is equal to the cost of equity for a utility company, the market to book
1251 value will be approximately 1.0.

1252

1253 **Q. Is the notion that when a market to book ratio equals one the company is**
1254 **earning its cost of capital accepted in finance literature?**

1255 A. Yes. A couple of references from recent writings on cost of capital demonstrate
1256 that it is commonly accepted that a market to book ratio of 1.0 implies a company
1257 is earning its cost of capital. For example, Seth Armitage in his text, "The Cost of
1258 Capital" states:

1259

1260 "The ... aim of regulation implies that the market value of the company should
1261 be equal to the book value, at least immediately after a price-setting review If
1262 market value exceeds book value, it suggests that the actual rate of return exceeds
1263 the cost of capital, and vice versa."¹⁹

1264

1265 Eugene Fama and Kenneth French in their 2002 article on the equity premium use
1266 the principle that a market to book ratio of 1.0 implies a company is earning its
1267 cost of capital then they note that ratios of above 1.0 are evidence of earned
1268 returns above the cost of equity:

1269

1270 "Since, on average, the market value of equity is substantially higher than its book
1271 value, it seems safe to conclude that on average, the expected return on
1272 investment exceeds the cost of capital."²⁰

1273

1274 **Q. Describe the database you developed to evaluate the relationship between**
1275 **market to book ratios and returns on equity?**

1276 A. Exhibit 1.04 lists the companies used in my database. These companies include
1277 electric and natural gas distribution companies that are covered by Value Line
1278 Investment Survey and the Yahoo! Finance website. The date I downloaded the
1279 data is 23 November, 2005. I have excluded a few companies that have
1280 significant upstream oil and gas operations and that have recently undergone

¹⁹ Armitage, S., 2005, p. 324.

²⁰ Fama and French, 2002, p 644.

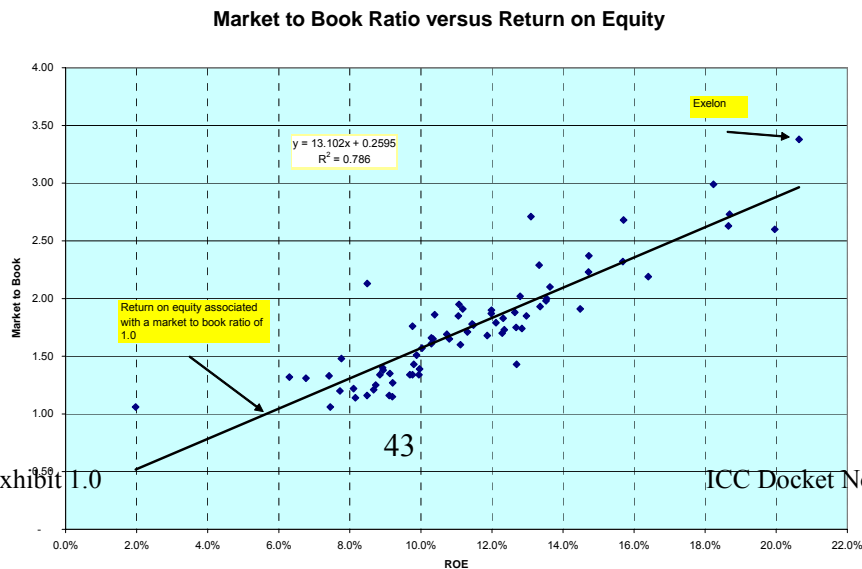
financial restructuring. After removing these companies, the database includes 71 utility firms. The market to book ratio, the forward return on equity and other statistics were obtained from Yahoo! while the Betas were taken from Value Line. Exhibit 1.04 shows that the market to book ratio for utility companies is generally above 1.0 with Exelon leading the way at 3.38. The average market to book value is for all companies in the database is 1.75.

Q. Given that the market to book value is above 1.0, what is the implication regarding utility company earned returns?

A. The implication is very simple. Utility companies are earning more than their cost of capital. The fact that companies are earning more than their cost of capital is not something utility companies, Wall Street, cost of capital consultants and even regulatory commissions like to acknowledge, but it is a basic fact.

Q. How does the market to book ratio relate to the earned return on equity?

A. The scatter chart below compares the earned return on equity with the market to book ratio for each of the companies in the sample. The graph illustrates the strong positive relationship between the two statistics. The trend line on the graph shows how one can develop a relationship between the market to book ratio and the earned return to derive the return on equity that is commensurate with a market to book ratio of 1.0. Note that the company with both the highest market to book ratio and the highest return on equity on the graph is Exelon Corporation.



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Q. How have you computed an equation to relate the market to book ratio to the return on equity?

A. I have constructed ordinary least squares regression equations using the market to book ratio as the dependent variable and the return on equity, debt leverage, beta, earnings growth and size are independent variables. The only variable that is significant in this regression is the return on equity. Therefore, I have used the simple regression of market to book ratio and return on equity for my analysis. The R-squared of this regression demonstrates that 78.6% of the variation in market to book ratio is explained by variation in return on equity. The regression analysis produces the following equation for the market to book ratio as a function of the return on equity:

$$\text{Market to Book} = .2595 + 13.102 \times \text{ROE}$$

Rearranging the equation implies that return on equity can be related to the market to book ratio as follows:

$$\text{ROE} = -.0198 + \text{Market to Book} \times .07632$$

If a market to book ratio of 1.0 is input into the above equation, the return on equity consistent with the cost of capital is 5.65%.

1346 **Q. How have you computed the range in return on equity using the regression**
1347 **equation?**

1348 A. In order to have 95% confidence that I am not over-estimating the cost of capital
1349 using this method, I have computed an alternative equation using confidence
1350 intervals for the regression parameters. I adjusted the constant term and the return
1351 on equity coefficient by the two times the standard error so as to be 95% sure that
1352 the cost of equity is not overstated. Using the alternative coefficients, the
1353 equation that produces the highest cost of equity estimate is the following:

$$\text{ROE} = -.0132 + \text{Market to Book} \times .08134$$

1357 Plugging a market to book ratio of 1.0 in this equation yields a cost of capital of
1358 6.82%.

1360 **Q. What is the implication of the market to book ratio analysis with respect to**
1361 **Dr. Hadaway's risk premium method?**

1362 A. The analysis completely invalidates his approach. Dr. Hadaway compiles returns
1363 that have been granted by regulatory commissions and compares those returns to
1364 the treasury yield that was present at the time of the decisions. This approach
1365 would only have meaning if the market to book ratios of companies approximated
1366 1.0 after the rate decision. Since the market to book ratio has consistently been
1367 above one, Dr. Hadaway's risk premium analysis simply confirms that regulatory
1368 commissions have been granting returns in excess of the cost of capital to utility
1369 companies.

1370
1371
1372 **IX. VERIFICATION OF INVESTMENT BANK COST OF CAPITAL**
1373 **USING THE CAPITAL ASSET PRICING MODEL**
1374

1375 **Q. Summarize the application of CAPM for determining ComEd's cost of**
1376 **capital.**

1377 A. The well known CAPM formula for the cost of equity of a security is $k_{i,t} = R_{f,t} +$
1378 $\beta_i \times \text{EMRP}$. In this equation:

- 1380 ▪ $R_{f,t}$ is the risk free rate for the current period (t) and it is the only variable
1381 directly affected by movements in the overall cost of capital in the
1382 economy.
- 1383 ▪ β_i is the covariance between returns on the security and the market returns
1384 divided by the overall variance of market returns. This parameter is the
1385 only input affected by the risk of the security in question and the β_i
1386 parameter is not expected to vary over time unless there is a change in
1387 business and/or the financial risk of the company.
- 1388 ▪ EMRP is the expected return on a fully diversified portfolio of equity
1389 securities over and above the rate of return on risk free securities. This
1390 variable is a function only of aggregate preferences by people in the
1391 economy for risky investments versus risk free investments. It is not
1392 affected by current interest rates, the risk of the security, or movements in
1393 the overall stock market.

1394
1395 The CAPM formula is simple. It has a solid theoretical foundation in that non-
1396 diversifiable risks are related to return and, it is the most commonly applied
1397 model in estimating the cost of capital for valuation analyses.²¹ The CAPM has
1398 been used by the ICC and its Staff in estimating cost of capital for years and Dr.
1399 Hadaway used the formula in his testimony.

1400
1401 Given the widespread use of the model, I have made an estimate of ComEd's cost
1402 of capital using the CAPM. In making this estimate I have attempted to

²¹ Armitage, S., 2005, p. 262.

incorporate both current research and common methods used by practitioners. I also demonstrate that Dr. Hadaway's application of the model uses assumptions for each of the three input parameters that overestimate ComEd's cost of equity capital.

Q. How does your cost of equity estimate from the CAPM model compare to the estimate made by Dr. Hadaway?

A. A reasonable cost of equity range for ComEd from the CAPM is between 6.69% and 7.31%. This number is well below Dr. Hadaway's application of the CAPM which results in range between 10.36% and 10.82%. A comparison of the CAPM estimates and the components that result in the different numbers is shown on the table below²²:

| | My CAPM Number | Dr. Hadaway's Number | Reason for Difference |
|----------------|-------------------|-------------------------|---|
| R_{ft} | 4.50% | 5.47% | Dr. Hadway uses a forecast number; I use a current number |
| β_i | 0.625 | .74-.81 | Removal of NICOR from sample; No reversion to 1.0 mean |
| EMRP | 3.50% - 4.50% | 6.60% | Dr. Hadway uses historic data; I use current literature |
| Cost of Equity | 6.69% - 7.31% | 10.36%-10.82% | |

The CAPM range of 6.69% to 7.31% in the table above confirms that the Morgan Stanley cost of equity capital of 7.75% does not overstate ComEd's cost of equity capital.

Q. What are some of the problems with the theory and practical application of the CAPM?

A. Despite being a widely-used and simple model, there are a number of well known problems with the theory and practical application of the CAPM. Financial economists have studied the question of whether the model is consistent with actual market behavior for more than 40 years. The central question in this work

²² Dr. Hadaway refers to a 6.2% market risk premium in his written text and he uses a 6.6% risk premium in Exhibit 8.9 where he calculates the CAPM.

1434 is whether beta is in fact the only measure of risk that is required for evaluating
1435 cost of capital. Researchers performing sophisticated statistical analysis have not
1436 been able to verify that Beta is the only measure of risk that is priced in equity
1437 securities. Problems with the CAPM theory are recounted by Ravi Jagannathan
1438 and Iwan Meier in their 2001 article “Do We Need CAPM for Capital
1439 Budgeting:”

1440
1441 The CAPM as a model has been seriously challenged in the academic literature....
1442 [S]ince the critique by Fama and French (1992) there is consensus in the
1443 academic literature that the CAPM as taught in MBA classes is not a good model
1444 – it provides a very imprecise estimate of the cost of capital.... [T]here is
1445 overwhelming evidence in the academic literature that for over two decades
1446 business schools have been teaching the wrong model – or at least recommending
1447 the use of the wrong inputs – for calculating the cost of capital.²³

1448
1449 In addition to theoretical problems with the model itself, there are issues
1450 associated with each of the three input parameters -- $R_{f,t}$, β_i and EMRP. Debates
1451 on the risk free rate concern whether there truly is a risk free security and what
1452 duration of government bonds should be used as a proxy for risk free investments.
1453 Controversy surrounding the beta involves whether statistical analysis of past
1454 prices is a reasonable reflection of prospective risk, whether “raw” betas should
1455 be adjusted for mean reversion and how to adjust betas in a comparative sample
1456 for different levels of leverage. The expected equity market risk premium or
1457 EMRP is subject to even more dispute than the other input parameters. Questions
1458 involving the level of the EMRP have been called “the most debated issue in
1459 finance”²⁴ and “the premier question relating to the cost of capital, for theorists
1460 and practitioners alike.”²⁵ A large body of research demonstrates that use of

²³ Jagannathan, R. and Meier, I. 2001, “Do We Need CAPM For Capital Budgeting?”, Kellogg School of Management, Finance Department, pp 1-3.

²⁴ Koller, T., Goedhart, M., Wessells, D., 2005, Valuation Measuring and Managing the Value of Companies, Hoboken, New Jersey, John Wiley & Sons p. 297.

²⁵ Armitage, S., 2005, p. 87.

1461 historic risk premia to measure the expected market returns is a biased approach
1462 which far exceeds the true expectations of investors.

1463

1464 The remainder of my discussion of the CAPM discusses the three inputs in the
1465 order of their controversy, beginning with the risk free rate, then moving to beta
1466 and finally addressing the risk premium.

1467

1468 **Q. What risk free rate does Dr. Hadaway apply in the CAPM Model and what**
1469 **number have you used?**

1470 **A.** Dr. Hadaway uses a forecast of the effective yield on long-term Treasury Bonds
1471 derived from a forecast made by Standard and Poor's corporation. This interest
1472 rate forecast produces a risk free rate of 5.47%. Dr. Hadaway states "with current
1473 interest rates at historically low levels, I believe a forecasted rate offers a better
1474 CAPM estimate of the on-going cost of capital." (ComEd exhibit 8.0, page 36.) I
1475 have used a Treasury Bond yield of 4.50% which is the approximate current yield.
1476 In describing why I use a different parameter, I address both theoretical and
1477 measurement issues with regard to the risk free rate. The first question is whether
1478 use of a 10-year Treasury bond yield is appropriate in the CAPM. The second
1479 issue is whether it is reasonable to use an interest rate forecast in rate proceedings.

1480

1481 **Q. What are alternative approaches to computing the risk-free rate in CAPM**
1482 **cost of capital analysis?**

1483 **A.** There are debates concerning implementation of the risk free rate in the CAPM.
1484 Some suggest using long-term Treasury bond yields, some advocate short-term
1485 Treasury Bills and still others argue for use of the yield on inflation indexed
1486 bonds plus the expected rate of inflation. The primary argument against using
1487 long-term Treasury Bond yields as a proxy for the risk free rate is that holders of
1488 long-term bonds accept inflation risk and those yields are therefore not risk-free.
1489 Further, during times at which an inverted yield curve exists, the long-term

1490 treasury yield will produce a lower risk free parameter than the Treasury Bill rate.
1491 Those opposed to use of a short-term rate contend that the duration of cash flows
1492 from short-term investments does not match the duration of cash flows received
1493 from an investment in a stock.²⁶

1494

1495 Given the relatively flat current yield curve and the fact that the most common
1496 approach used by practitioners in applying the CAPM is to use the 10-year
1497 Treasury Bond yield,²⁷ I do not disagree with Dr. Hadaway's use of the 10-year
1498 yield in CAPM analysis in this case.

1499

1500 **Q. Is Dr. Hadaway's use of a forecasted bond yield appropriate as an input to**
1501 **the CAPM?**

1502 A. No. Use of a forecast is inconsistent with the notion of a historic test year and Dr.
1503 Hadaway's forecast of interest rates is not consistent with actual data. Even if one
1504 were to accept the use of forecasted interest rates in regulatory proceedings, one
1505 should use market based measures such as forward rates implied in the current
1506 yield structure, or interest rates in forward markets rather than photocopying one
1507 page from an undocumented forecast. (Dr. Hadway's photocopy of the Standard
1508 and Poor's forecast is included in ComEd Exhibit 8.2.)

1509

1510 **Q. Why is use of a forecasted interest rate inconsistent with historic test year**
1511 **principles?**

1512 A. The notion behind use of a historic test year is to use actual accounting data,
1513 adjusting certain revenue, expense and rate base items for fixed, known and
1514 measurable changes. A forecast of interest rates is certainly not fixed, known or
1515 measurable. If a historic test year is used in regulatory proceedings, one cannot
1516 pick and choose to apply speculative forecasts of macroeconomic variables in

²⁶ Koller, T., Goedhart, M., Wessells, D., 2005, pp. 296-297.

²⁷ Arzac, Enrique, 2005, p. 62.

adjusting historic data. If interest rates are forecast, then one could argue that a future test year rather than a forecast test year should be used for other elements of the case, including sales levels, dividend yields in the DCF, and other parameters.

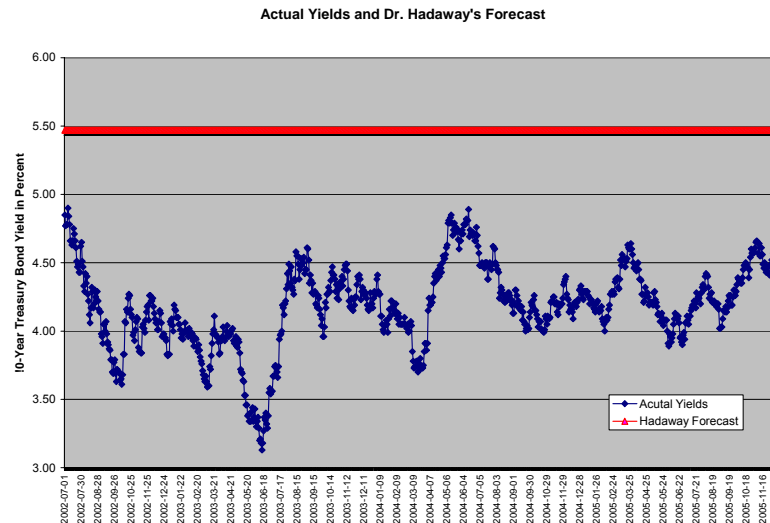
Problems with the use of forecasted interest rates are illustrated by the Docket No. 02-0798 October 22, 2003 Final Order. Ameren had made a similar argument to ComEd suggesting that current bond yields could not be used because interest rates were then also at historic lows. The company advocated a forecast bond yield of 5.75% rather than the yields of 3.13% to 4.61% that occurred during the tenure of the case. The ICC rightfully dismissed Ameren's argument, and it turns out that Ameren's forecast of a 5.75% bond yield was far higher than actual yields. The 10-year Treasury Bond yield on the day the order was signed on October 22, 2003 was 4.29% and the yields for more than two years after that date through December 2005 averaged 4.28%, 1.47% below Ameren's forecast. Thus, in the Ameren case, the ICC was absolutely right in not speculating on future levels of interest rates. In its order, the ICC stated that, "The Commission is of the opinion that the mere existence of relatively low interest rates is not a sufficient basis" to use interest rates different from the current rate. (Order from 02-0798 at page 72) The Ameren case clearly demonstrates the danger in entering the interest rate forecasting arena.

Q. Does Dr. Hadaway's statement that interest rates are currently at historic lows correspond to actual data?

A. No. The graph below compares Dr. Hadaway's interest rate forecast of 5.47% with actual 10-year Treasury Bond yields over the past three and a half years since the middle of 2002.²⁸ The graph demonstrates that Dr. Hadaway's forecast

²⁸ Source: St. Louis Federal Reserve Bank, Economic Data - FRED II (www.research.stlouisfed.org), series ID DGS10.

is far above the historic levels and is not a reasonable number to use in rate proceedings.



Q. What risk free rate have you used in your CAPM analysis?

A. I have used the 10-year Treasury Bond yield of 4.5% which is the approximate current yield and it is high relative to yields over the past few years.

Q. Discuss the major issues with the second input parameter for the CAPM, the beta.

A. As stated above, the beta parameter is the only input that relates the cost of equity to the risk of a particular company in the CAPM. While the beta parameter is generally derived from historic data, it is, in theory, a forward-looking number. For example, Ogier et. al. state: “In practice, the best way to estimate the beta of a firm is to calculate the historical covariance between the returns on the firm’s equity and returns from the market as a whole, and use this proxy for the future

beta.”²⁹ Use of historic data to measure covariance means that the measured beta for a company can have anomalies which result in high or low numbers that are not representative of forward looking non-diversifiable risk. The statistical aberrations can occur when companies happen to have very bad or good news not related to the overall market. If this news drives the individual stock prices and the general market is moving in the same direction, the measured betas will be artificially high.

Before discussing specific issues associated with measurement of beta for purposes of establishing ComEd’s cost of equity capital, I note that since beta is ultimately a function of financial risk and business risk, it should not be very different for companies that have similar levels of leverage in the same industry. Also, unless there are changes in business risk and/or financial risk, the beta parameter should not vary from period to period. This implies, for example, that beta parameter used in the NICOR case should not be significantly different from betas in this case.

Technical issues associated with implementation of the beta in the CAPM involve whether beta parameters estimated in a regression equation should be pushed towards one and whether betas from a comparative companies in a sample should be un-levered and then re-levered.

Q. What Beta does Dr. Hadaway use in his CAPM analysis?

A. Dr. Hadaway uses an average of equity betas from value line of .81 for LDC’s and .75 for electric utilities. His sample of seven LDC’s includes NICOR, which has a beta of 1.10. As I explain below, NICOR is an obvious outlier not representative of prospective distribution company risks, given its low operating

²⁹ Ogier, T, Rugman, J., Spicer, L., 2004, *The Real Cost of Capital A Business Field Guide to Better Financial Decisions*, Great Britain: FT Prentice Hall, page 43.

1608 risk, its low debt leverage and its high earned return on equity. Three of the other
1609 companies in his LDC sample include companies for which more than 30% of
1610 revenues come from un-regulated activities. Dr. Hadaway's sample of 12 electric
1611 companies includes companies with un-regulated generation and companies that
1612 are so small that they may have a size premium in computing the cost of equity.
1613 After rates become effective for most ratepayers in 2007, each of these companies
1614 in the sample should have a beta higher than ComEd -- a pure distribution
1615 company with very low business risk.

1616

1617 **Q. Is a Beta of .81 or .75 plausible for a company with the prospective risk**
1618 **profile of ComEd after rates become effective in January 2007?**

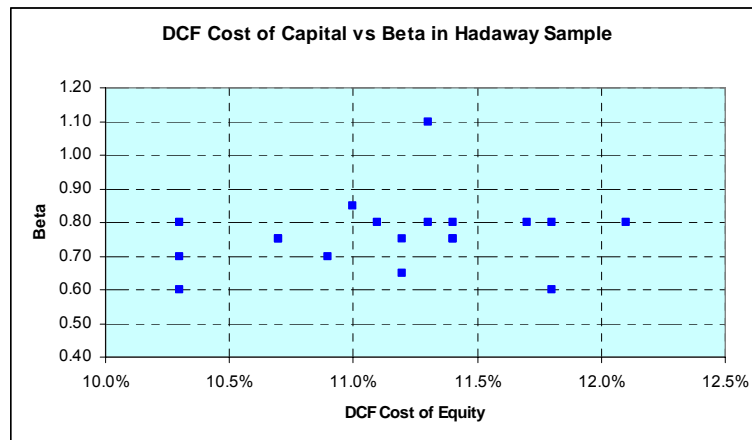
1619 A. No. Given that ComEd would have virtually no risk related to generation
1620 purchases if its auction proposal is adopted and given the limited risk associated
1621 with residential usage, a beta close to 1.0 is simply not plausible for ComEd.
1622 ComEd will have much less business risk than a typical company in the economy
1623 (that has a beta of 1.0) when rates are effective in 2007. Dr. Hadway's beta
1624 estimates of .81 or .75 are also higher than betas estimated by the ICC staff in
1625 recent cases. In the Ameren case the Commission found that a beta of .62 was
1626 appropriate. (Ameren order in docket 02-0798 at page 85) In the NICOR case,
1627 Staff used a beta of .66 (McNally direct testimony in 04-0779 at page 27). Since
1628 betas should be stable if the nature of a business does not change, Dr. Hadaway's
1629 implicit suggestion is that the betas used by the ICC and its Staff in these two
1630 earlier cases was too low.

1631

1632 **Q. Are Dr. Hadaway's beta estimates consistent with his DCF cost of equity**
1633 **estimates?**

1634 A. No. Since beta is the only measure of company risk in the CAPM, one would
1635 expect the cost of capital for individual companies to be greater the higher the
1636 beta. A scatter plot of the beta and Dr. Hadaway's DCF estimated cost of capital

should, if each is calculated consistently with applicable theory, show a strong positive relationship with the betas. As shown in the graph below, a plot of Dr. Hadaway's beta and his DCF cost of cost of capital show no relationship at all.



Q. The Value Line betas and Staff's betas include an adjustment that pushes regression parameters towards 1.0, is this adjustment appropriate for utility companies?

A. No. Value Line computes its beta from a regression equation that measures an unadjusted beta. Then, Value Line adds an adjustment to move the beta toward 1.0 using the following equation³⁰:

$$\text{Adjusted beta} = 2/3 \times \text{Unadjusted beta} + 1/3 \times 1.0$$

or

$$\text{Unadjusted beta} = \text{Adjusted beta} \times 3/2 - 1/2$$

³⁰ Patterson, C.S., 1995, *The Cost of Capital: Theory and Estimation*, Westport CT: Quorum Books, p. 130.

1672 Staff typically makes a similar adjustment after estimating raw betas from
1673 regression analysis. Since betas are below 1.0 for utility companies, the
1674 adjustment increases betas and it increases the estimated cost of capital.

1675

1676 The adjustment for betas is generally accepted in cost of capital literature for
1677 companies with betas above 1.0 because of a tendency of betas to revert to the
1678 mean. Statistical studies have demonstrated that “there appeared to be greater
1679 measurement error associated with the betas of extreme values.”³¹ The mean
1680 reversion adjustment is accepted for companies with observed high betas. The
1681 risk of these high beta companies often moves towards 1.0 over time due to
1682 statistical measurement problems and due to the tendency of high business risk
1683 companies to eventually moderate. However, the mean reversion is far less
1684 accepted for utility companies with betas of below 1.0.³² Seth Armitage refers to
1685 a study by Gombola and Kahl that suggested that the adjustment for utility
1686 company betas should not push the statistic toward 1.0, but rather toward .5:

1687

1688 ... the betas of most utility shares follow a mean reverting process, but around a
1689 mean that is close to .5. They and others also discuss the problem of ‘transient
1690 betas’ that are temporarily much larger or smaller than usual, due to an episode of
1691 a major fluctuation in share price.³³

1692

1693 When the mean reversion adjustment used by Value Line is made for utility
1694 companies, an implicit assumption is that (1) the betas are unstable; (2) that they
1695 will eventually move to 1.0; and, (3) that the risk of the utility companies will
1696 eventually move toward the overall risk of other companies. These assumptions
1697 are not reasonable as it has been clear that utility betas are below 1.0 for decades.
1698 Making the mean reversion adjustment is convenient for those who advocate for
1699 higher utility cost of capital, but it is wrong.

³¹ Ogier, T, Rugman, J., Spicer, L., 2004, *The Real Cost of Capital A Business Field Guide to Better Financial Decisions*, Great Britain: FT Prentice Hall, page 54.

³² Armitage, S., 2005, p. 285.

³³ Ibid, p. 284.

1700

1701 **Q. Does the Value Line beta of 1.1 for NICOR demonstrate problems with the**
1702 **assumption of reversion to a mean of 1.0?**

1703 A. Yes. NICOR is a clear outlier in Dr. Hadaway's sample with a beta of 1.1 -- the
1704 next highest beta in his gas sample is .8. NICOR's high beta is an artifact from
1705 regression analysis because of the way the company experienced declines in its
1706 stock price when news of SEC investigations and allegations of fraud related to its
1707 manipulation of the performance based regulation program became public. This
1708 stock price decline happened to occur when the overall stock market was falling,
1709 as shown on the graph below. When NICOR's stock price subsequently
1710 recovered from the bad news, the stock market happened to also be increasing.
1711 This abnormality in historic stock prices caused NICOR's measured beta to be
1712 above 1.0 which is not representative of the on-going business risk for the
1713 company.

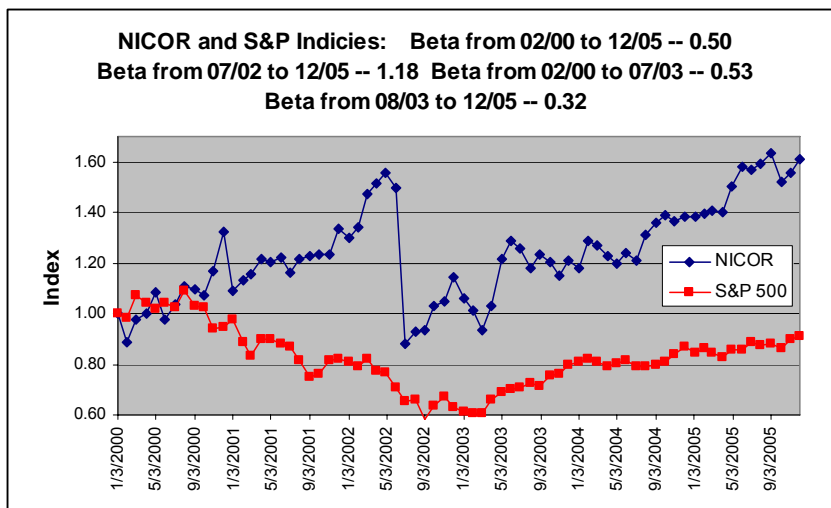
1714

1715 The graph below reports betas for sub-periods within the total sample period
1716 beginning in 2001. The sub-period betas confirm that NICOR's beta has reverted
1717 back to a level far below 1.0 and that its beta was biased by the bad news. Before
1718 NICOR's fraud problems, its measured beta was .53. After the stock recovery its
1719 beta was .32. However, when the period surrounding the fraud publicity is the
1720 beginning of the measurement period, the beta is above 1.18.

1721

1722 The case of NICOR demonstrates that using a mean reversion adjustment wherein
1723 betas are pushed towards 1.0 to correct statistical irregularity is inappropriate for
1724 utility companies. Instead, the statistical anomalies should push the beta back to
1725 the industry average beta for utility companies. The 1.10 beta obviously does not
1726 measure prospective risk and making a correction by moving the beta towards 1.0
1727 would not help. The NICOR example effectively demonstrates that mean
1728 reversion adjustments of utility betas are not appropriate. These adjustments do

not improve the measurement of beta but instead simply result in increased cost of equity numbers.



Q. What would the Value Line beta be in Dr. Hadaway's sample if the mean reversion adjustment were not included?

A. I have applied the Value Line beta equation above to remove the mean reversion factor from Dr. Hadaway's sample. Without NICOR, the average beta in Dr. Hadaway's sample is .75. After taking away the mean reversion adjustment his sample produces a beta of .625. This number is a more reasonable beta estimate for ComEd because utility betas do not tend to be volatile and there is no a priori reason for betas to move closer to 1.0.

Q. Turning to the third input parameter to the CAPM, discuss some general issues with regard to the expected equity risk premium.

A. Before delving into details of applying a specific EMRP in this case, it is useful to review some big picture issues associated the parameter:

- 1767 - The EMRP is expressed in real terms and is not a nominal number. This
1768 means the EMRP does not increase or decrease when interest rates change
1769 or when the expected rate of inflation changes. It would be wrong, for
1770 example, to update this number in the midst of a case because of changes
1771 in the interest rate.
1772
- 1773 - The EMRP comes from the general risk preferences of agents in an
1774 economy for equities relative to risk free securities. If people did not have
1775 risk aversion for equities relative to risk free bonds, the EMRP would be
1776 zero. This means changes in the EMRP are driven by changes in general
1777 preferences for equities relative to risk free securities. Because the EMRP
1778 comes from risk preferences, it should be stable over long time periods as
1779 risk preferences do not swing from month to month or year to year.
1780
- 1781 - Third, the EMRP is an expected number rather than a number that can be
1782 directly measured from actual realized returns. The fact that the EMRP is
1783 an expected number means that it does not change when the stock market
1784 goes up or down because realized earnings change or because general
1785 economic activity is robust or depressed.
1786
- 1787 - Fourth, the EMRP is an economy wide number not unique to ComEd.
1788 Unlike Beta which measures the risk associated with a specific company,
1789 the EMRP is the same whether it is used in valuing a paper company,
1790 gauging the rate of return for an oil project or assessing the share price of
1791 an airline company.
1792
- 1793 - Fifth, the EMRP has been the subject of a very large body of research.
1794 This research has been performed by people who are not funded by parties
1795 who have a vested interest in producing a particularly high or a

1796 particularly low risk premium number. Since the EMRP is not unique to
1797 ComEd, since it is an expected number difficult to calculate, and since it is
1798 not expected to change over short time periods, the EMRP research is
1799 directly relevant to this and other regulatory proceedings.

1800

1801 **Q. What is the implication for this case of the above five big picture points?**

1802 A. The major implication of the above points is that it would be very presumptuous
1803 and even arrogant to compute a different EMRP than the number which has been
1804 studied so intently by economists, investment banks and other valuation
1805 practitioners. Attempting to compute an independent EMRP for purposes of this
1806 case and ignoring current research would be analogous to making an independent
1807 forecast of the GDP or interest rates. The source for EMRP should instead be a
1808 review of the body of literature published on the subject.

1809

1810 **Q. How does Dr. Hadaway's EMRP estimate compare with research on the**
1811 **subject?**

1812 A. Dr. Hadaway uses a 6.6% EMRP from computation of the historic difference
1813 between actual realized stock market returns and the yield on ten-year treasury
1814 bonds (his written testimony refers to an EMRP of 6.2%).³⁴ The source of his
1815 number is the Ibbotson Associates 2005 yearbook (ComEd Exhibit 8.0, page 35).
1816 Dr. Hadway's number is far higher than EMRP suggested in the current literature
1817 which range from 1% to 5%. My survey of EMRP cost of capital research below
1818 demonstrates that a reasonable EMRP is far lower than the Ibbotson number and
1819 should be at most between 3.5% and 4.5%.

1820

1821 **Q. How have you organized the summary of EMRP research?**

³⁴ Dr. Hadaway's EMRP of 6.6% is much more reasonable than the EMRP of 9.98% used by ComEd's witness Thone in the last delivery service case.

1822 A. Since the EMRP has been subject to so much research, I do not suggest that my
1823 summary below is comprehensive. Instead I have attempted to highlight
1824 representative broad conclusions from the literature. In summarizing the EMRP
1825 research I divide the discussion into the following components:

- 1826 - General conclusions on the level of EMRP from current studies
 - 1827 - Computation of the EMRP from consumption theory
 - 1828 - Use of historic realized returns from sources such as Ibbotson to estimate
1829 the EMRP
 - 1830 - Application of the DCF and other forward-looking models to directly
1831 estimate the EMRP
 - 1832 - Computation of the EMRP from survey data
- 1833

1834 **Q. What are some of the general comments on EMRP found in the literature?**

1835 A. The overwhelming conclusion from current research on the EMRP is that the
1836 return expected by investors and appropriate for use in the CAPM is far lower
1837 than the actual returns in the commonly referred to Ibbotson study quoted by Dr.
1838 Hadaway. Some general statements that represent current general opinions on the
1839 EMRP include the following:

1840
1841 Enrique Arzac recaps a wide body of research by stating “We show that both the
1842 historic record, financial theory, and prospective estimates based on stock prices
1843 and growth expectations, all indicate that the future equity premium in developed
1844 capital markets is likely between 3 and 5%...”³⁵

1845
1846 Seth Artimage summarizes many different studies by noting: “Consensus is
1847 lacking at present on the best way of estimating the equity premium, and
1848 reasonable estimates lie in the range of 1% or 5%...”³⁶

1849
1850 Koller et al. describe the general biases in EMRP: “Historical estimates found in
1851 most textbooks (and locked in the mind of many), which often report numbers
1852 near 8% are too high for valuation purposes because they compare the market risk

³⁵ Arzac, Enrique, 2005, p. 35.

³⁶ Ibid, p. 299.

1853 premium versus short-term bonds, use only 75 years of data, and are biased by the
1854 historical strength of the U.S. market.”³⁷

1855

1856 **Q. What are the implications from consumption theory regarding the EMRP?**

1857 A. Since an article was published in 1985 by Mehra and Prescott, a phenomena
1858 known as the ‘equity risk premium puzzle’ has been studied by economists. The
1859 Mehra and Prescott puzzle is described by Claus and Thomas as follows.

1860

1861 “Their model indicates that the variance–covariance matrix of aggregate
1862 consumption and returns on stocks and bonds, when combined with reasonable
1863 risk-aversion parameters, implies equity premium estimates that are less than one
1864 percent. Despite subsequent efforts to bridge this gap, concerns remain about the
1865 validity of the Ibbotson estimate...”³⁸

1866

1867 Enrique Arzac explains that the equity premium puzzle suggests “the high-equity
1868 premium observed over the period 1889 to 1978 cannot be reconciled with an
1869 asset pricing model in which economic agents exhibit positive rates of time
1870 preference....”³⁹

1871

1872 **Q. What is the argument for using historic realized returns published by**
1873 **Ibbotson and Associates in estimating the prospective expected risk**
1874 **premium?**

1875 A. The idea of using historic premia as measured by Ibbotson comes from the notion
1876 that the EMRP should be constant over time, only changing with risk preferences
1877 in the economy. If the expected overall real market premium is constant and
1878 realized returns were always above the expected returns, stock prices would
1879 eventually adjust (increasing to drive down returns) so that investors would
1880 eventually earn their expected return. While historic returns were once the norm
1881 in EMRP estimates, the general consensus is now that these numbers are far too
1882 high. Below are a few examples from cost of capital literature describing how
1883 actual returns are not appropriate in measuring the expected risk premium:

³⁷ Koller, T., Goedhart, M., Wessells, D., 2005, Valuation Measuring and Managing the Value of Companies, Hoboken, New Jersey, John Wiley & Sons p. 306.

³⁸ Claus and Thomas, 2001, p. 1630.

³⁹ Arzac, Enrique, 2005, p. 41.

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Enrique Arzac refers to research by Blanchard who “developed a dynamic model of the expectations of real returns on stocks and bonds. He found that the risk premium during the 1930’s and 1940’s was unusually high ranging from 3 to 5% in the early 1930’s to more than 10% in the 1940’s. Afterwards, it started a gradual decline with some relatively minor fluctuations and reached between 2 and 3% in the early 1990’s.”⁴⁰

Claus and Thomas emphasize the notion that historic returns exceed the expected amounts: “Despite substantial variation in the underlying fundamentals across markets and over time, observing that every one of our 69 country-year estimates lies well below eight percent suggests that the Ibbotson estimate is too high for our sample period.”⁴¹

Q. Has cost of capital research addressed reasons why historic observed market premia overstate the expected market returns?

A. Yes. A number of explanations have been developed to explain why historic numbers such as those reported by Ibbotson are so high. The quotes below from Tim Koller and his colleagues as well as from Enrique Arzac describe how autocorrelation of returns, survivorship bias and underestimation of inflation risk explain the high historic premiums:

Koller et al state that “...the general consensus is that the aggregate stock market exhibits negative autocorrelation. In this case, the arithmetic mean is biased upward...” They also discuss survivorship bias: “...If we subtract a 1% to 2% survivorship bias from the long-term arithmetic average of 5.5%, the difference implies the future range of U.S. market risk premium should be 3.5% to 4.5%.”⁴²

Enrique Arzac presents data from Sigel (2002) that the nominal arithmetic risk premium was 5.9% from 1926-2002 while it was only .2% from 1982-2002. In explaining the historic risk premium data, Arzac states that ... recent data for estimating the equity premium are not difficult to construct. For example, investors seem to have underestimated the effect of inflation on bond returns prior to 1980 and demanded low returns on bonds, which may have resulted in an exaggerated risk premium.”⁴³

⁴⁰ Ibid, Page 41.

⁴¹ Claus and Thomas, p. 1630.

⁴² Koller, T., Goedhart, M., Wessells, D., 2005, p. 303.

⁴³ Arzac, Enrique, 2005, p. 43.

1921 **Q. Has the EMRP been estimated using the DCF and related forward-looking**
1922 **models?**

1923 A. Yes. There have been various studies that have attempted to directly estimate
1924 expected market premiums from the DCF and other models. These analyses have
1925 attempted to avoid the upward bias in cost of capital estimation that occurs if one
1926 uses forecasts of earnings growth from investment analysts. I have already
1927 referred to two of the papers, written by Fama and French and Claus and Thomas.
1928 Estimated market risk premiums found in these studies are summarized in the
1929 following excerpts:

1930
1931 Seth Armitage describes the DCF studies as follows: "The arithmetic mean real
1932 premium between 1900 and 2000 was ... 7.0% for the United States, measured
1933 against the yield on long-term bonds. But a simple forward looking estimate
1934 based on applying the dividend discount model to the market suggests a risk
1935 premium of 3% to 4%. This is why many people do not expect the premium in
1936 the future to be as large as it has been in the past, especially in the second half of
1937 the twentieth century. They place more faith in reasonable expectations about the
1938 future than in outcomes observed in recent decades. Furthermore, several
1939 researchers have argued recently that investors did not expect premiums as large
1940 as they got in the twentieth century. Armitage concludes that Most of the studies
1941 indicate a range for historic ex ante premiums ... of between 1.5% and 4.5% --
1942 considerably below the actual arithmetic mean premium since 1920..."⁴⁴

1943
1944 Enrique Arzac uses a DCF model to estimate the equity market premium of
1945 between 3.08% and 3.32%.⁴⁵

1946
1947 In their widely cited 2002 article, Fama and French state that "the equity premium
1948 estimates from the dividend and earnings growth models, 2.55 percent and 4.32
1949 percent, are far below the estimate from the average return, 7.43 percent....The
1950 expected return estimates from the dividend and earnings growth models are more
1951 precise than the average return. The standard error of the dividend growth
1952 estimate of the expected return for 1951 to 2000 is 0.74 percent, versus 2.43
1953 percent for the average stock return....The earnings growth model is not,
1954 however, clearly superior to the dividend growth model."⁴⁶

1955

⁴⁴ Armitage, S., 2005, p. 281.

⁴⁵ Arzac, Enrique, 2005, p. 45.

⁴⁶ Fama and French, 2002.

1956 **Q. How has the EMRP been estimated from surveying investor expectations?**

1957 A. An alternative method for estimating the EMRP is to ask investors what they
1958 expect to earn on a mutual fund consisting of the S&P 500. Some of the EMRP
1959 estimates from this source are recounted by Tim Ogier, John Rugman, Lucinda
1960 Spicer in their 2005 publication below:

1961
1962 “In the US, Merrill Lynch publishes ‘bottom up’ expected returns on the Standard
1963 and Poor’s 500, derived by averaging expected return estimates for stocks in the
1964 Standard & Poor’s 500....In recent years, the Merrill Lynch expected return
1965 estimates have indicated an EMRP in the region of 4% to 5%.”⁴⁷

1966
1967 “The Value Line projected market risk premia are somewhat more volatile than
1968 those from the Merrill Lynch DDM model. In recent years they have generally
1969 ranged from 2% to 6%....”⁴⁸

1970
1971 Greenwich Associates had published the results of an annual survey of pension
1972 plan officers regarding expected returns on the Standard and Poor’s 500 for a
1973 five-year holding period. The Greenwich Associates survey has generally
1974 indicated an EMRP in a 2%-3% range.”⁴⁹

1975
1976 Claus and Thomas also cite investor expectations. They summarize the
1977 information as follows: “Surveys of institutional investors also suggest an equity
1978 premium substantially below eight percent (e.g., Burr (1998)), and there are
1979 indications that this belief has been held for many years (e.g., Benore (1983)) .
1980 Also, the weighted average cost of capital used in discounted cash flow valuations
1981 provided in analysts’ research reports usually implies an equity premium below
1982 five percent.”⁵⁰

1983

1984 **Q. Explain how you have developed an EMRP from this research?**

1985 A. A review of the EMRP literature would justify a market premium for the CAPM
1986 of 3% or less. Nevertheless, to cover the higher end of estimates and to make sure
1987 that I am not accused of selectively taking low numbers, I have used an EMRP of
1988 between 3.5% and 4.5%. This range encompasses the high end of the Fama study
1989 and is at or near the upper bound of most research.

⁴⁷ Ogier, T, Rugman, J., Spicer, L., 2004, p 74.

⁴⁸ Ibid, p 75.

⁴⁹ Ibid, p 75.

⁵⁰ Claus and Thomas, 2001, p. 1631.

1990

1991 Applying the risk free rate, the beta and the market risk premium to the CAPM
1992 yields a cost of capital range for ComEd of 6.69% to 7.0% as shown below:

1993

1994
$$k_{i,t} = R_{f,t} + \beta_i \times \text{EMRP},$$

1995 or

1996
$$6.69\% = 4.5\% + .625 \times 3.5\%$$

1997 and

1998
$$7.00\% = 4.5\% + .625 \times 4.5\%.$$

1999

2000

2001 **X. VERIFICATION OF INVESTMENT BANK COST OF CAPITAL**
2002 **USING THE DIVIDEND DISCOUNT MODEL AND PRICE**
2003 **EARNINGS RATIOS**

2004

2005 **Q. How is the dividend discount model used to determine cost of equity capital?**

2006 **A.** The dividend discount model or DCF model has been used in regulatory
2007 proceedings for decades to estimate the cost of equity capital. The model derives
2008 the implied cost of capital from the way investors are assumed to value shares
2009 when they make projections of the future cash they receive as dividends. If the
2010 future dividends and the current price is known, then one can back-out the cost of
2011 equity that must have been used by investors. The model only works if the
2012 market is assumed to be efficient and if investor expectations are rational. By
2013 assuming growth in dividends is constant, one can rearrange the dividend
2014 valuation model and establish a simple equation for the cost of capital. This
2015 formula to derive the cost of capital is next year's dividend divided by the current
2016 stock price (the dividend yield) plus the growth rate in dividends expected by
2017 marginal investors who set the stock price. While the inputs to the model are the
2018 dividend yield and the growth rate, these parameters are not the direct drivers of

2019 risk and cost of capital as the risk free rate, the beta and the expected market risk
2020 premium are in the CAPM.

2021

2022 **Q. Is inference of the cost of capital only possible using the dividend discount**
2023 **model as the basis for simulating investor valuation?**

2024 A. No. Inference of cost of capital from an investor valuation model does not require
2025 use of dividend forecasts to establish stock price valuation. Instead of using the
2026 present value of projected dividends as the underlying valuation model, other
2027 valuation formulas can be used to infer the cost of equity capital. In particular, a
2028 model that is used to evaluate price to earnings ratios can be the basis for backing-
2029 out the implicit cost of equity capital.

2030

2031 In the paragraphs below, I use the dividend discount valuation model and the
2032 price earnings valuation formulas to compute the implied discount rates of equity
2033 investors. As with my CAPM discussion, I comment on Dr. Hadway's
2034 application of the DCF model while working through the analysis.

2035

2036 **Q. Summarize the alternative DCF cost of capital estimates presented below.**

2037 A. I discuss a lot of numbers from various different applications of the DCF model in
2038 the paragraphs below. First, I recount DCF numbers that are included in Dr.
2039 Hadaway's testimony. Next, I discuss alternative costs of equity capital that can
2040 be directly computed from information in his exhibits. Finally, I describe the
2041 DCF cost of equity estimates that I computed from my data sources. These DCF
2042 estimates are listed in the table below:

2043

2044

2045

2046

2047

| Summary of Alternative DCF Estimates | |
|--------------------------------------|--------------------------|
| | DCF Cost of Equity |
| Hadwaway Reported | |
| Recommended from 2 Stage DCF | 11.05% |
| "Traditional DCF" | 9.54% |
| Hadwaway Data, Not Reported | |
| DCF without GDP Growth | 8.59% |
| Growth from ROE x B | 8.04% |
| My DCF Analysis | |
| Dividend Discount Model | 7.88% |
| P/E Valuation Model | 7.84% |

Q. Describe some issues associated with implementation of the DCF model.

A. As is the case with application of the CAPM, computing the cost of equity capital using the DCF model is not a matter of simply plugging in inputs that are not subject to any debate. Four noteworthy issues which I address in computing ComEd's cost of equity capital using the DCF model below are:

- How should one select an appropriate sample of comparable companies with similar risk to ComEd to derive the implied cost of equity capital;
- What method should be used to compute the constant expected growth rate of marginal investors for each company in the comparable sample;
- Whether a valuation model for using earnings is a better way to derive the implicit cost of equity capital than dividend growth model; and,
- Should adjustments for quarterly compounding be made in deriving implicit discount rates.

2083 **Q. How have you analyzed DCF issues in reviewing the work of Dr. Hadaway**
2084 **and inferring a reasonable cost of equity capital from the DCF model?**

2085 A. I have addressed the above issues through developing sensitivity analyses with
2086 alternative parameters and valuation models. As with my CAPM discussion, I
2087 also refer to recent literature on the subject. Instead of arguing that one particular
2088 sample of comparable companies uniquely represents the risk of ComEd, I have
2089 computed the implied cost of capital for a variety of different comparable groups.
2090 I have also used alternative techniques to compute growth rates including Value
2091 Line earnings and dividend growth projections, historic earnings growth rates,
2092 sustainable growth rates from the return on equity multiplied by the retention rate
2093 and growth rate forecasts from the Yahoo! Finance website. I have performed all
2094 of the analysis using both the traditional dividend discount model and a formula
2095 that evaluates price to earnings ratios. Finally, I address the issue of how
2096 quarterly compounding adjustments should be reflected the regulatory process by
2097 demonstrating the concepts with a simple illustrative example.

2098
2099 **Q. How does Dr. Hadaway estimate ComEd's cost of equity capital using the**
2100 **DCF model?**

2101 A. Dr. Hadaway computes a variety of DCF estimates using alternative growth rates
2102 and different comparable groups. While ultimately suggesting the ICC should use
2103 a DCF cost of equity capital range of between 10.6% and 11.5% (ComEd Exhibit
2104 8.0 at page 39), he also presents alternative estimates in his testimony and
2105 exhibits. Dr. Hadaway elaborates that his primary recommendation comes from
2106 the DCF model analysis (ComEd Exhibit 8.0 at page 16). He describes results
2107 using an average of projected analyst earnings growth rates, growth rates resulting
2108 from the ROE multiplied by retention rate formula and the projected GDP growth
2109 rate. This "traditional DCF" analysis results in a cost of equity range of 9.3% to
2110 9.7% for his natural gas sample and a range of 9.0% to 9.2% for the electric
2111 company sample. However, Dr. Hadaway rejects the "traditional DCF" method

“because this result falls more than 100 basis points or more below my risk premium checks of reasonableness, it is excluded from my ROE recommendation.” (ComEd Exhibit 8.0 at page 32)

The most dubious part of Dr. Hadaway’s DCF model other than his results oriented statement above is his use of a projected nominal GDP growth rate as a proxy for dividend growth. Dr. Hadway’s DCF cost of equity capital estimates with and without the GDP growth rates are shown in the table below (Dr. Hadaway did not present these estimates.) When the GDP growth is taken out of his numbers, they are only slightly above the Morgan Stanley 7.75% estimate.

| Hadaway DCF Cost of Equity Estimates with Alternative Growth Rates | | | |
|--|--|--|-----------------|
| Sample | Hadaway Avearge of Analyst Projections, ROE x B and GDP Growth | Hadaway Avearge of Analyst Projections and ROE x B | Hadaway ROE x B |
| Natural Gas | 9.84% | 8.65% | 8.12% |
| Electric Sample | 9.23% | 8.53% | 7.97% |

I will explain below that the most reasonable method used by Dr. Hadaway is where he computes growth from the retention rate multiplied by the earned return on equity. The rightmost column in the table shows that using this method with Dr. Hadaway’s data results in a cost of equity capital range of between 8.12% and 7.90%.

Q. Summarize how you have inferred the cost of equity capital from the dividend discount model and the price to earnings valuation formula.

A. The two tables below summarize my analysis of the implied cost of equity from two different valuation models. As is apparent from the table, I have performed the analysis on a variety of different comparative samples and using alternative growth rates. The table presents the median cost of equity from various different analyses. I subsequently explain that the most appropriate growth rate to use in DCF analysis is derived from the return on equity multiplied by the retention rate

and the most appropriate valuation formula is the P/E model. The range in cost of equity using these parameters for the model varies from 7.67% to 8.10%. Since 7.75% is in this range, the DCF model confirms the Morgan Stanley cost of equity capital as did the market to book analysis and the CAPM.

| Inferred Cost of Equity from P/E Valuation Formula | | | | |
|--|-------------------------------------|------------------------|-------------------------|--------------------|
| | Five Year Projected in Yahoo! | Value Line Earnings | Value Line Dividends | ROE x Retention |
| Hadaway | 8.08% | 8.48% | 7.65% | 7.81% |
| Thone - Electric | 7.91% | 8.10% | 6.89% | 7.72% |
| Thone - Natural Gas | 8.68% | 9.39% | 8.30% | 8.10% |
| Staff - NICOR | 8.08% | 9.22% | 7.46% | 7.67% |

| Inferred Cost of Equity from Dividend Discount Valuation Formula | | | | |
|--|-------------------------------------|------------------------|-------------------------|--------------------|
| | Five Year Projected in Yahoo! | Value Line Earnings | Value Line Dividends | ROE x Retention |
| Hadaway | 8.58% | 8.38% | 7.14% | 7.71% |
| Thone - Electric | 8.58% | 7.89% | 5.90% | 7.72% |
| Thone - Natural Gas | 8.70% | 10.70% | 7.29% | 8.14% |
| Staff - NICOR | 8.58% | 10.58% | 6.26% | 7.54% |

Q. Discuss how your data sources and DCF equations compare to the information used by Dr. Hadaway.

A. To illustrate my data sources compared to Dr. Hadaway's data I work through the components the DCF cost of equity capital for a single company. Since the DCF analysis cannot be performed for ComEd as it does not have traded shares, I have selected NICOR to illustrate the DCF model mechanics and data sources.

Dr. Hadaway estimates that NICOR's cost of equity capital using his "traditional constant growth DCF model" is 7.86% (ComEd Exhibit 8.6.) He also shows that NICOR's expected return on equity from Value Line is 13.5% in Exhibit 8.3 (Value Line now projects NICOR's return on equity as 14%). If NICOR indeed earns 14.0% and if one were to subscribe to Dr. Hadway's traditional DCF model in estimating NICOR's cost of equity capital, the ICC has allowed a utility

company to earn 6.14% more than its cost of capital. In other words, NICOR's rates permit the company to earn almost double its cost of capital! This result is certainly not fair to ratepayers and hopefully the same thing will not happen in this case.

Focusing on a single company highlights information sources used by Dr. Hadaway's and the details of his approach. NICOR's 7.9% cost of equity capital consists of the forward dividend yield and the average of four growth rate estimates as shown in the table below.

| Dr Hadway's NICOR DCF Estimate | | | | | |
|--------------------------------|--------------|----------|---------------------|----------|----------------|
| Share Price | 39.67 | | ROE x (1-Payout) | | 2.77% |
| | | | Zacks | | 2.30% |
| Forward Dividend | 1.86 | | Value Line Earnings | | 1.00% |
| | | | GDP Growth | | 6.60% |
| Dividend Yield | 4.69% | | Average Growth | | 3.17% |
| | Yield | Plus | Growth | Equals | Cost of Equity |
| DCF Cost of Equity | 4.69% | + | 3.17% | = | 7.86% |

The primary issue demonstrated by the table above for the single example of NICOR is application of the appropriate growth rate that reflects investor expectations. In the table below I show separate NICOR DCF cost of capital estimates using Dr. Hadaway's alternative growth rate forecasting methods. At least for the case of NICOR, Dr. Hadaway's analysis is consistent with the Morgan Stanley 7.75% cost of equity number. For example, if the Value Line earnings growth rates are used, NICOR's cost of equity capital from Dr. Hadaway's information is only 5.69%. If NICOR's cost of capital were really 5.69%, and if the Value Line earned return on equity of 14% turns out to be true, then NICOR will earn 8.31% more than its cost of capital.

| DCF with Alternative Growth Rates Used by Dr. Hadaway | |
|--|--------|
| ROE x (1-Payout) | 7.46% |
| Zacks | 6.99% |
| Value Line Earnings | 5.69% |
| GDP Growth | 11.29% |

The information I used in my analysis is similar to that used by Dr. Hadaway. Current share prices and forward dividends per share are derived from the Yahoo! Website. Data for the alternative growth rates come from both Value Line and Yahoo!. The alternative growth rates and the DCF cost of capital estimate for NICOR example is shown in the table below:

| NICOR DCF Cost with Alternative Growth Rates | | | | | |
|--|-------|------|----------------------------|--------|----------------|
| Share Price | 40.54 | | Forward ROE x Retention | | 3.00% |
| | | | TTM ROE x Retention | | 3.60% |
| | | | Yahoo! 5 Yr Growth | | 3.00% |
| Forward Dividend | 1.86 | | Historic Growth Rate | | -10.90% |
| | | | Value Line Earnings Growth | | 2.00% |
| | | | Value Line Dividend Growth | | 1.50% |
| Dividend Yield | 4.59% | | Average w/o Historic | | 2.62% |
| | Yield | Plus | Growth | Equals | Cost of Equity |
| DCF Cost of Equity | 4.59% | + | 2.62% | = | 7.21% |

Q. Discuss the first issue associated with implementation of the DCF model, choice of a comparable sample.

A. A comparable sample is intended to collect a group of companies with similar risks to the company in question. While this objective is commendable, given the incentives of rate case consultants to come up with a high or a low number, one must wonder whether the samples are derived by selecting companies that will result in a favorable number for the position presented. Instead of adding another comparative sample to this case and becoming mired in debates about whether it is appropriate to include company x or y in the sample, I have performed the DCF analysis on a variety of comparative samples from this and prior cases. These comparative samples include:

2257

2258

- Dr. Hadaway's sample from this case.

2259

- Dr. Thone's sample from ComEd's last rate case.

2260

- Staff witness McNally's sample from the recent NICOR case.

2261

2262

A list of the companies in each sample is included in Exhibit 1.05 that presents

2263

results of my DCF analysis.

2264

2265 **Q. Moving to the issue of growth rates, how have you analyzed the appropriate**
2266 **growth rate to apply in the DCF formula?**

2267 A. As is apparent from the variation in DCF estimates above, determining the
2268 appropriate growth rate to apply is the most significant issue in implementation of
2269 the DCF model. To address the issue I begin by describing how it is now
2270 generally accepted in cost of capital research that use of earnings estimates made
2271 by investment analysts overstates actual growth. Next, I discuss why application
2272 of the return on equity multiplied by retention rates is a reasonable way to derive
2273 utility company growth rates. Finally, I describe why Dr. Hadway's use of a
2274 6.6% estimated GDP growth is completely wrong for estimating utility company
2275 growth rates.

2276

2277 **Q. Discuss some of the current research with respect to use of growth rates from**
2278 **investment analyst forecasts in deriving the implied cost of capital?**

2279 A. A number of researchers have demonstrated that investment analyst estimates of
2280 growth in earnings are biased in an upward direction. If the stock market is
2281 efficient and analyst growth rates are too high, stock prices and equity values
2282 must reflect the true unbiased growth estimates rather than the upwardly biased
2283 analyst forecasts. This means that use of analyst forecasts as the growth rate will
2284 result over-estimate the cost of capital inferred from the DCF valuation equation.

2285

2286 **Q. Discuss some of the current research with respect to use of growth rates from**
2287 **investment analyst forecasts in deriving the implied cost of capital?**

2288 A. A number of researchers have documented the upward bias in analyst growth
2289 projections and commensurate bias in DCF cost of capital estimates. A few
2290 examples of such research are:

2291
2292 In their text titled "Valuation: Measuring and Managing the Value of Companies"
2293 published in 2005, Tim Koller, Marc Goedhart and David Wessels state that
2294 *"analyst forecasts focus on the short term and are severely upward biased."*⁵¹
2295

2296 Enrique Arzac comments on the difficulty of predicting growth rates and the
2297 potential for the DCF model to over-estimate the cost of equity as follows: "The
2298 problem with [the DCF] approach is that long-term dividend growth rate of an
2299 individual company cannot be estimated with any degree of precision. Hence, the
2300 dividend growth model is not likely to produce reliable estimates of the cost of
2301 equity capital of individual companies....A number of empirical studies have
2302 documented optimistic bias in analysts' opinions....Thus, it seems reasonable to
2303 conclude that [the DCF equation] yields an upper bound to the equity
2304 premium."⁵²
2305

2306 Claus and Thomas conclude that earnings and dividend growth rates used for the
2307 DCF model "exhibit substantial optimism bias and need to be adjusted
2308 downward."⁵³
2309

2310 Louis Chan and his coauthors conclude that "over the period 1982 to 1998, the
2311 median of the distribution of IBES growth forecasts is about 14.5 percent, a far
2312 cry from the median realized five year growth rate of about 9 percent for income
2313 before extraordinary items."⁵⁴
2314

2315 Fama and French state that "In short, we find no evidence to support a forecast of
2316 strong future dividend or earnings growth at the end of our sample period."⁵⁵
2317

⁵¹ Koller, T., Goedhart, M., Wessells, D., 2005, Valuation Measuring and Managing the Value of Companies, Hoboken, New Jersey, John Wiley & Sons p. 305.

⁵² Ibid, Arzac, Enrique, 2005, pp. 43-44.

⁵³ Ibid, Claus and Thomas, 2001, p. 1662.

⁵⁴ Chan, L., Karceski, J and Lakonishok, J, 2003, The Level and Persistence of Growth Rates, Journal of Finance, 58, p. 672.

⁵⁵ Fama and French, 2002.

2318 **Q. Given the problems with analyst growth projections, discuss how one can**
2319 **estimate growth rates in utility company earnings using the return on equity**
2320 **multiplied by the retention rate formula?**

2321 A. If the prospective return on equity is constant and new shares are issued at book
2322 value, it is easy to demonstrate that the growth rate in earnings and dividends can
2323 be modeled using a formula that multiplies the future return on equity by one
2324 minus the dividend payout ratio:

2325
2326
$$\text{Percentage Growth in Earnings} = \text{Return on Equity} \times (1 - \text{Dividend Payout Ratio})$$

2327

2328 To illustrate why this formula represents growth, consider a couple of extreme
2329 cases:

- 2330 - If the dividend payout ratio is 100% then even when a utility is currently
2331 earning more than its cost of capital (such as Exelon and NICOR) the earnings
2332 and book value do not grow (unless equity is issued at a market to book value
2333 above 1.0). Since the equity base does not increase because no earnings are
2334 retained, a constant future return on equity applied to a constant amount of
2335 equity means that the income also remains constant. With no earnings
2336 growth, the EPS growth is zero.
- 2337 - At the other extreme, if the dividend payout ratio is zero, then earnings
2338 increase book value of equity on a one for one basis. In this case without
2339 dividend payments (again assuming a constant return on equity) the book
2340 value of equity increases by the return on equity multiplied by the initial
2341 amount of equity on the balance sheet. Assuming a constant return is
2342 multiplied by the book value that increases at a growth rate defined by the
2343 return on equity, the earnings also growth at the return on equity. This is the
2344 growth rate implied by the formula above.

2345 - For intermediate cases where the dividend payout is between zero and one, the
2346 growth rate in earnings is the return on equity multiplied by one minus the
2347 dividend payout ratio under the assumption of a constant return on equity.
2348

2349 **Q. Is the retention rate multiplied by return on equity formula a reasonable for**
2350 **estimating the growth of utility company earnings?**

2351 A. Yes. Dr. Hadaway shows that although the return on equity has declined, it has
2352 been reasonably constant for utility companies over the past five years. It is
2353 reasonable to presume that investors expect future earnings to be similar in the
2354 long-run to the returns expected in the next year. If anything, one could argue
2355 that the return on equity multiplied by the retention rate somewhat overstates the
2356 growth rate because rational investors should not expect utilities to continue
2357 earning more than their cost of capital indefinitely. Long-term growth rates
2358 should therefore eventually decline as evidenced by the high industry market to
2359 book ratios. However, relative to other methods for estimating the growth rate,
2360 use of the retention rate multiplied to the return on equity is the most reasonable
2361 method.
2362

2363 **Q. Comment on Dr. Hadaway's testimony where he dismisses analyst growth**
2364 **rates because of the fact that earnings growth rates have declined since the**
2365 **last case.**

2366 A. On his testimony at page 29, Dr. Hadaway discusses the fact that projected
2367 growth rates estimated by Zachs investment survey and Value Line have declined.
2368 For example, he notes that the Value Line's three to five year growth rates for
2369 LDC's have declined from 7.5%-8.3% in 2001 to 4.4%-5.7% and the Zack's
2370 earnings growth rates for LDC's have declined from 6.6-6.7% to 4.3% to 5.2%.
2371 He suggests that the decline in growth rates – which result in a lower cost of
2372 capital estimate from the DCF formula – “support using more general long-term
2373 economic growth rates such as GDP ...”

2374 **Q. Do you agree with Hadaway's use of long-term GDP nominal growth rates in**
2375 **estimating the growth?**

2376 A. No. His approach is wrong from both a theoretical standpoint and a quantitative
2377 perspective. Problems with Dr. Hadaway's application of a 6.6% growth rate
2378 derived from his projection of nominal GDP growth include:

2379

2380 - First, the lower current growth rates relative to those expected in 2001
2381 simply reflect the fact that returns on equity have decreased for utilities as
2382 the cost of capital has declined. Per the discussion above of growth driven
2383 by return on equity multiplied by the retention rate, if the dividend payout
2384 is constant and the return on equity declines, the growth rate also declines.
2385 Using the return on equity over the past five years of 10.82% multiplied
2386 by the retention rate in Dr. Hadaway's sample results in a growth rate of
2387 3.68%. This means the declining growth rate expectations are not at all
2388 irrational.

2389

2390 - Second, rational investment analysts realize there is a limit to the extent
2391 that market to book ratios can be sustained given that regulators are
2392 mandated to grant returns equivalent to the cost of capital. Declining
2393 returns could easily imply negative growth rates.

2394

2395 - Third, one of the foundations of Dr. Hadaway uses for his use of GDP
2396 growth in the DCF is from the article written by Chan, Karceski, and
2397 Lakonishok. These authors do criticize the use of analyst growth rates, but
2398 the criticism is that analyst growth rates are too high, not too low.

2399

2400 - Fourth, the GDP number used by Dr. Hadaway is much higher than GDP
2401 figure used in the Chan, Karceski, and Lakonishok article. While Dr.

2402 Hadaway uses a number of 6.6%, the authors suggest using 3.5% as
2403 demonstrated by the following statement:

2404
2405 “... the growth in real income before extraordinary items is roughly 3.5
2406 percent per year. This is consistent with the historical growth rate in real
2407 gross domestic product, which has averaged about 3.4 percent per year
2408 over the period 1950 to 1998. It is difficult to see how the profitability of
2409 the business sector over the long term can grow much faster than overall
2410 gross domestic product.”⁵⁶

2411

2412 - Fifth, while GDP growth has been used as a representation of aggregate
2413 growth for all stocks, this does not mean that each industry grows at the
2414 same rate. Even if different industries earn the same return, the industries
2415 that have lower dividend payouts experience higher growth. Before 2003
2416 for example, Microsoft experienced very high growth and it did not pay a
2417 dividend. It is silly to assume that the growth rate is the same for a
2418 declining return industry as it is for the high technology sector. Louis
2419 Chan and his coauthors recognize that different industries grow at
2420 different rates. Indeed the authors note that utility stocks have “relatively
2421 unexciting growth rates.”⁵⁷

2422

2423 - Sixth, and most important, the GDP growth rate of 6.6% used by Dr.
2424 Hadaway cannot be sustained if one uses his own data on dividend payout
2425 ratios. Companies in Dr. Hadaway’s sample had a retention rate of 32.7%.
2426 Using the growth rate formula discussed above, the return on equity for all
2427 companies in the utility industry would have to average 20.2% as shown
2428 below:

2429

Growth = ROE x Retention, or

2430

6.6% = ROE x 32.7%, or

2431

ROE = 6.6%/32.7% = 20.2%.

⁵⁶ Ibid, p. 649.

⁵⁷ Ibid, Chan, L., Karceski, J and Lakonishok, J, 2003, p. 657.

2432

2433 While Exelon is achieving returns at this level (before the ComEd rate
2434 increases) I doubt that Dr. Hadaway believes most other utility companies
2435 can maintain a sustained return on equity beginning next year and lasting
2436 indefinitely of 20.2%.

2437

2438 **Q. Can the cost of equity capital be derived from stock price valuation models**
2439 **other than the Discounted Dividend Model?**

2440 A. Yes. The dividend discount model is only of a series of valuation models that can
2441 be used to infer the cost of equity capital required by investors. A well known
2442 formula used to explain the P/E ratio can also be used to derive the implicit cost
2443 of equity capital. A formula that explains the P/E ratio in terms key value drivers
2444 – the ability to earn more than the cost of capital and the ability to grow that
2445 difference – is given by the formula:

2446

2447
$$P/E = [1-g/ROE]/[k-g]$$

2448

2449 In this formula, P/E is the forward price to earnings ratio, g is the growth rate in
2450 earnings, ROE is the earned return on equity and k is the cost of equity capital.

2451

2452 **Q. How can the P/E ratio formula be used to compute the cost of capital?**

2453 A. Through re-arranging the P/E formula, one can compute the cost of equity from the
2454 P/E ratio. In this formula, the cost of equity capital is driven by the growth, the
2455 return on equity, and the forward earnings per share:

2456

2457
$$k = [EPS \times (1-ROE/g)]/P + g$$

2458

2459 The formula has been used in cost of capital analysis by Tim Koller, Marc
2460 Goedhart and David Wessels. The formula has advantages because it does not

2461 depend on the dividend payout ratio, the cost of capital is less sensitive to growth
2462 rates, and the cost of equity capital is driven by the fundamental drivers of value.
2463 In inferring the cost of capital from the P/E formula, I have used forward P/E
2464 ratios, forward EPS and forward ROE's from the Yahoo! Finance website. I have
2465 used the same statistics for earnings growth as was described above in explaining
2466 the dividend discount model.

2467

2468 **Q. With respect to the final issue you discussed in the introduction of this**
2469 **section, why did you not use quarterly compounding in your DCF analysis?**

2470 A. Because it is not appropriate. It is time to revisit the issue of quarterly
2471 compounding and consider the bigger picture of how the rate of return is applied
2472 to cash flows in the context of a rate case.

2473

2474 **Q. What is the general idea behind applying the DCF model on a quarterly**
2475 **basis?**

2476 A. In the US, companies pay dividends on a quarterly rather than an annual basis.
2477 Since the DCF model infers the discount rate from a valuation model, if dividends
2478 are received earlier in the year, investors would pay more for a stock than if
2479 dividends are received later, all else equal. Because the valuation is higher with
2480 earlier dividend payments, but the stock price is the given by the market, the
2481 inferred discount rate must be higher with earlier payments to create an
2482 equivalence between the value of expected dividends and the value of a share. As
2483 Dr. Hadaway notes, the ICC Staff has advocated use of a quarterly DCF model in
2484 regulatory proceedings for many years.

2485

2486 While I do not question the notion that a quarterly DCF model will produce a
2487 higher cost of capital, I do not agree that the quarterly model is fair to ratepayers
2488 and investors. The quarterly DCF model must ultimately be converted to an
2489 annual number for purposes of setting the rate of return and this is where

traditional application of the quarterly model falls apart. In computing an annualized cost of capital from the quarterly DCF model and applying that cost of capital in setting rates, the implicit assumption is that all cash flows occur at the end of the year. If the quarterly model is taken to its logical conclusion, one would also have to consider the timing of cash flows received by the utility company. Unless all revenues are received and all expenses are paid in the last hour of the last day of the year, computation of cost of capital from a quarterly model without doing the same for revenues and expenses will in fact allow a utility to earn more than its cost of capital.

Q. Have you reviewed the literature on quarterly compounding?

A. Yes. While the issue is acknowledged in the literature, it is not used in many studies that apply the DCF. For example, the Fama and French study and the Claus and Thomas studies do not make the quarterly adjustment when they estimate cost of capital from the DCF approach. The literature does suggest that if a quarterly adjustment is made, the whole DCF model should be stated in quarterly terms and the final inferred quarterly discount rate should be re-stated to an annual rate using the formula:

$$\text{Annual Rate} = (1 + \text{Quarterly Rate})^4 - 1.$$

Seth Armitage notes complications with the quarterly model even if the quarterly timing of dividends is reflected and if quarterly compounding is applied because of the manner in which dividend increases occur. He writes that if dividend jumps are not reflected in the analysis, the DCF model overstates the cost of capital: "If dividends are growing, and the annual rise is about to take effect, the next quarterly payment will be higher than the last and will then stay the same for three quarters. In this case, using the next dividend payment in the quarterly

2518 version of [the DCF] equation will overstate the expected return.”⁵⁸ He goes on
2519 to state that “it seems fair to say that the inaccuracies caused by the timing of
2520 dividends are very small compared with the general uncertainty about the cost of
2521 equity.”

2522

2523 **Q. How does Dr. Hadaway adjust his DCF cost of equity estimates for quarterly**
2524 **compounding?**

2525 A. Dr. Hadaway acknowledges that quarterly compounding has a minor effect on the
2526 cost of capital estimates. He states that the quarterly model increases the implied
2527 cost of equity capital by .1 to .3 percent (ComEd exhibit 8.0 at page 32 and at
2528 page 33).

2529

2530 **Q. Explain why application of the quarterly DCF model allows a company to**
2531 **earn more than its cost of capital using a simple example?**

2532 A. To demonstrate how the quarterly DCF model allows a utility company to earn
2533 more than its cost of capital, consider a very simple example where a company is
2534 paying a dividend of \$3 per quarter and the current market value of the share is
2535 \$10. Further assume that the company will cease to exist at the end of one year.
2536 Construction of this example magnifies the effect of quarterly versus annual
2537 compounding.

2538

2539 If the annual DCF model is applied in measuring the cost of capital, the \$3
2540 dividend is accumulated to \$12 at the end of the year and used to infer the cost of
2541 capital. Using \$12 dividend relative to the \$10 market value, the implied cost of
2542 equity is 20% ($[12/10]-1$). On the other hand, if the quarterly dividend model is
2543 used, then the cost of equity capital is much higher. With quarterly compounding,
2544 the timing of the dividends means that \$10 in market value implies that investors
2545 must be attributing more risk to the earlier received cash flows. If they were not

⁵⁸ Page 271.

attributing more risk the dividends, investors would place a higher value than \$10 on the expected cash flow. The discount rate from a quarterly annuity of \$3 that yields a present value of \$10 is 7.71% per quarter. Converting the quarterly return of 7.71% to an annual number using the formula above implies an annual cost of equity of 34.61%. The question raised by this example is whether a regulatory commission should apply a rate of return of 20% to the investment base from application of the annual DCF model or whether a rate of return of 35% from application of the quarterly model should be applied.

Q. Use the simple example to explain why the cost of capital inferred from the annual DCF and not quarterly DCF allows a company to appropriately recover its cost of capital?

A. The appropriateness of the annual DCF model is demonstrated by considering what happens to the utility company if the 20% estimate from the annual model is applied as the return on investment in a regulatory context. Since the utility company lasts only for a year in the simple example, the company must recover its investment of \$10 as well as a return commensurate with its cost of capital. To evaluate whether the annual or quarterly model produces fair results, one can compute the internal rate of return realized by investors under the two alternatives. Since dividends are realized on a quarterly basis, the investors should realize a rate of return of 35% because the early dividends imply that investors must be attributing a high cost of capital to the cash flows.

If the utility receives its investment of \$10 plus a return on that investment equal to the cost of capital at the very end of the year, the quarterly model is indeed appropriate. Here, where the cash flows are received at the end of the year and the utility receives 20%, it will receive \$12 at the end of the year. In this case its internal rate of return is 20%. Since the annualized cost of capital from the quarterly DCF model is 35%, the utility does not recover its cost of capital.

2575

2576 The example becomes more interesting if the annual return of 20% plus the
2577 capital investment of \$12 is recovered over four quarters yielding \$3 per quarter.

2578 In this case, even though the commission has granted a return of 20%, the
2579 company's realized return is 35% which does in fact equate to the cost of capital.

2580 This result is worthy of restatement – if the annual and not the quarterly DCF
2581 model is applied in determining the rate of return and if the rate of return is
2582 realized on a quarterly basis because utility companies do not earn all of their cash
2583 flows at the end of the year – the annual DCF model and not the quarterly allows
2584 the company to earn its cost of capital.

2585

2586 **Q. Continue with the simple example and explain why the quarterly DCF model**
2587 **results in utilities being able to recover more than their cost of capital?**

2588 A. The over-recovery implicit in the quarterly DCF model is demonstrated by
2589 considering what happens to the utility company in the simple example if the 35%
2590 quarterly based estimate is used. As in the discussion above, I consider the
2591 realized internal rate of return assuming cash flows are realized only at the end of
2592 the year and assuming that cash flows are realized continually throughout the
2593 year. By setting the allowed return at 35%, the company realizes total cash flow
2594 of \$13.5 rather than \$12 if the 20% return were used.

2595

2596 To evaluate results of the quarterly DCF model, first consider the case where the
2597 \$13.5 cash flow is only realized on the very last day of the year. Here, the
2598 company does indeed realize the risk adjusted return of 35% inferred from the
2599 quarterly DCF model. However, and most important, if the \$13.5 cash flows are
2600 realized in four increments on a quarterly basis, then the company earns a return
2601 of 63%. Since utility companies recover cash flows over the course of a year and
2602 not all at the end of the year, the quarterly DCF adjustment allows a company to

2603 recover more than its true cost of capital. The ICC should reject application of the
2604 quarterly DCF in this and future proceedings.

2605

2606 **Q. Summarize results from alternative formulations of the dividend discount**
2607 **model and the P/E ratio model?**

2608 A. Exhibit 1.05 shows the details of my DCF estimates without a quarterly
2609 adjustment. Results from both the dividend discount model and the P/E model are
2610 shown on each page. The exhibit shows estimates from the alternative samples
2611 and different growth rates.

2612

2613 **Q. Is this the end of your testimony?**

2614 A. Yes.